The Builder.

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Water.

THE saying of the great Charles V. of Spain, "that a man gains another soul for each additional language he acquires," has a strong competitive examination smack. With perhaps more truth it may be said, that each soundly understood branch of physical science confers an additional sense to the investigator of nature. Hundreds of phenomena, misunderstood or even unnoticed by untutored eyes, are to such as have the knowledge a source of pleasant observation, and even sometimes of useful adaptation. But some training and thought are required before a man can somewhat understand even apparently very simple phenomena. Take, for instance, such a seemingly simple and commonplace thing as water. If the history of science may be said to represent on a large scale the history of its gradual acquirement by each average student, it is a lesson to recollect with what difficulty the now, to us, very simple properties of this liquid have been reduced to known laws. When we remember that mankind have been for several thousand years in the laboratory of nature, it is somewhat humiliating to human intellect to see how slowly our present knowledge has been acquired, and how much yet remains to be attained. It is scarcely eighty years ago that Watt demonstrated the chemical composition of water. It is only within historical times that another great engineer proved that a body plunged into water lost a portion of its weight equal in amount to that of the displaced water. It is little more than two hundred years that we have understood why the 15 pounds on the square inch pressure of the atmosphere should balance some 32 feet of water. It is just 200 years ago that Blaise Pascal showed that liquids press equally in all directions, and that the perpendicular pressure of water on any vertical, oblique, or horizontal surface, is equal to the weight of a column of the liquid whose base is equal to the surface pressed, and the height of which is equal to the depth of the centre of gravity of the surface below the upper horizontal surface of the liquid. It is less than seventy years ago that Bramah patented his application of the principle discovered by Pascal, in the form of the hydraulic press, the first of which is now preserved in the Museum of Patents at Kensington. It would really appear that this hydrostatic law has scarcely found a popular acceptance with us. Now a cubic foot of water weighs 62½ lb., and it therefore presses with that weight upon the square foot of water below it, and if anything could conduce to the spread of a knowledge of this hydrostatic law, it should be the late horrible disaster at Sheffield. As we stated last week, the height of the water in the reservoir was about 90 feet, so that there was a pressure of nearly 2¼ tons on every square foot of ground at the bottom of the reservoir. And yet one of the daily papers asserted that the base of the embankment was only 40 feet wide. Such an embankment could not have stood this enormous pressure for five minutes. Our very able contemporary, the *Saturday Review*, appears to have fallen into an opposite mistake, and writes that—"a hundred million gallons of water were poised in mid air," and "we shall soon know what barrier the engineers interposed between this *dead weight* and the hollow valley below." An embankment would, of course, *cæteris paribus*, have to undergo just as much pressure from a foot in width of water as from a lake a mile in width, as the pressure depends merely upon the height of the head. Perhaps it is somewhat difficult to form a definite image before the mind's eye of a liquid thus pressing in all directions and in proportion to its depth; we may see it physically demonstrated, but the internal action and reaction of the invisible particles are hidden to the sight. It might, perhaps, be made clearer by supposing water to consist of an infinite number of small perfectly-shaped spheres of a hard and incompressible substance, like that of the diamond, and, at the same time, with a similarly polished surface. We could imagine that the contents of a vessel full of an assemblage of such polished spheres would, if emptied on the ground, disperse themselves in all directions, instead of forming a solid heap. A single sphere in the vessel would press in all directions, but its weight would tend to solicit it more especially in a downward direction—and *seriatim*. The pressure of the whole assemblage of spheres on the sides of the vessel would thus increase towards the bottom. Given that a volume of such minute incompressible balls has the faculty of at once transmitting a pressure in all directions, then the pressures thus transmitted to the sides of a vessel are in proportion to the areas of the surfaces. This law thus answers to the principle of virtual velocities; for, supposing two cylinders of unequal sizes and joined together, in each of which is a piston, if the smaller piston be set in motion in order to propel the larger one, the small piston will have to move through a proportionately greater distance. If the small piston be 1½ inch in diameter and the larger 10 inches, while the small piston is propelled with a force of (say) 36 lb., the 10-inch piston, by the motion of the smaller one, will have transmitted to it a pressure of 1,600 lb. But while the small piston is being moved 6 inches, the larger one will move very little more than one-tenth of an inch. This is the whole principle of the hydraulic press. We have assumed the minute spheres of which water may be made up to be incompressible. Water was believed incompressible, until Oersted, the Danish philosopher, first *accurately* proved that its volume could be diminished by pressure. The amount is, however, so small, that it is never practically taken into account, as a column of water of a sectional area of one square inch is only compressed to an amount corresponding to 50 millionths of its volume, by a pressure of 15 lb., or of one atmosphere. Heat might be assumed to act as a lubricant between our supposed spheres, and when the temperature is lowered they cohere together and assume the form of crystals. The water expands during this act. It has been found that 10 cubic feet of water weigh about the same as 11 cubic feet of ice. When only a cubic inch of water crystalises into the form of ice, the increase of bulk it undergoes appears to exert a force of about 13½ tons within its range of expansion. This silent, but almost irresistible action, would not be without its influence on an ill-made embankment. The most insidious agent, however, in the weakening of hydraulic structures, is that somewhat mysterious and, at any rate as yet, incompletely investigated power known under the name of capillary attraction. It is a matter of daily observation that, for instance, a heap of sand or ashes, or a common wall, when placed in communication with a plentiful supply of water, is found to draw up the moisture, often to a great height. When dry sand is thrown upon damp ground, the moisture is also thus drawn up; and some gardeners use this principle for preserving plants during wet seasons, by throwing sand or the waste of heckled flax round the stems. By dipping a strip of blotting paper in a tumbler of water, the liquid can be thereby conducted from thence into an empty vessel. Numberless other phenomena, such as the elevation of oil or grease by the wick of a lamp or a candle; the similar action of a piece of sugar or a sponge on water, of blotting-paper on ink; of the piece of wick used to conduct the oil from the oil-cup to an axle bearing; the action of a dry towel or handkerchief, are all referable to the same principle. The mechanical power of capillary attraction is astonishingly great; and a piece of wood, when swelling up from this cause, can tear its iron bands asunder. As the fibres of ropes are twisted spirally, when they are soaked with water they swell up and get shorter, in the same way as new linen is liable to shrink when washed for the first time. The great power exerted by the contraction of ropes when wetted rendered, as will be remembered, great service in the raising of the large obelisk in front of St. Peter's, at Rome. When the outside interstices of the bodies we have named are closed up, capillary attraction is no longer present, and it is upon this principle that ropes are tarred, paper is sized, wood is painted, leather is greased, and that nature has provided the hair and wool of animals, and particularly the feathers of aquatic birds, with a film of grease to keep out the moisture. The fat clays used for the puddle-walls of water-embankments simply carry out the same function; and being, when properly puddled, impermeable to water, act as a protection against the disintegrating influence that the water would otherwise have on the main earthenwork structure behind. Earthwork, even when dry, if not well consolidated, exerts a side pressure,—like that of, for instance, grain,—the laws of which were first investigated by Coulomb. Already a semi-fluid, earth, when damp, and then soaked with water, gradually approaches the state of physical cohesion of water itself, and at last unites in the same current. If, indeed, any inert agent with which we deal can be called treacherous, it is certain that water can be so termed. It is not inconceivable that an entire hill, much less an artificial embankment, could be blown up by means of the pressure of water. If we imagine an internal reservoir, at a couple of hundred feet depth, and in communication with a head of water, by means of a crevice, the five tons or more on the square foot corresponding to such a weight of water must exert a powerful action on the cohesion of a mass, however large. When to this are added the searching influences of capillary attraction, it is scarcely possible to conceive any substance with sufficient cohesion to resist such a power. A mere hole of a water-rat could thus lead to a water-dam being blown up.

When we look back and see for what a comparatively short time merely the law governing the hydrostatic pressure has been understood, it is obvious that many more hidden questions yet wait for a solution.

It is scarcely to be doubted, for instance, that very many of the relations of water to heat, and when water assumes the form of steam, still offer fields for discovery. There is every reason to believe that the usual explanation of the phenomena attending the boiling of water is completely false. Mr. Grove, the distinguished physicist, in a lecture delivered last year before the Chemical Society, and in another read before the Royal Institution in January last, goes so far as to state that water never has been what is termed "boiled;" that its particles never have

been expanded by heat in the way generally explained in lectures on natural philosophy, and in works on the same subject. It appears that it has been impossible up to the present time to completely separate water from atmospheric air, or from nitrogen gas. In proportion, however, as water is deprived of air, the ebullition assumes quite a fresh shape, and it boils intermittently, with *sombresauts*, while the water reaches a temperature much higher than its usual boiling point. Mr. Grove found it impossible, by all the means in his power, to separate water from more or less nitrogen. He is inclined to think that the boiling of water cannot take place at all in the absence of some gas or other, and that even "if water, for instance, could be absolutely deprived of nitrogen, it would not boil until some portion of it were decomposed: that the physical severance of the molecules by heat is also a chemical severance." He found that after depriving water of air to the utmost practicable extent, that it "becomes avid for air." Thus, after "boiling" off many thousand tons of water in order to get mechanical power, we are met by a mystery in striving at an explanation merely of the physical aspect of the phenomenon.

There are thus undoubtedly many yet hidden agencies at work around us, but science has at least taught us to allow a margin for our ignorance. We do not understand why the particles of a piece of iron cohere together, but we wisely make a girder four, six, perhaps eight times the strength that it will ever be called upon to bear.

We leave our readers to apply these statements.

THE ARCHITECTURE OF PARIS UNDER NAPOLEON III.*

IF the reader of this and the preceding article, suggested in part by Mons. César Daly's work, were able to have before him a plan of Paris distinguishing the new routes, he would observe as one characteristic of the improvements, that those routes have been designed and formed radiating in direct lines from centres, and so that they intersect the older streets for the most part obliquely. The arrangement may be inconvenient to those who are accustomed to a rectangular disposition of streets, like that of many capitals,—as it is to those coming from London, whose walks may have familiarized them chiefly with such a district as Marylebone; but supposing the chosen centres to have been, or to be likely to be, established by position of public buildings, or otherwise by resort for pleasure or affairs, and that some little attention be given preliminarily, by the inhabitant or traveller, to study of a plan, the arrangement is in every respect the best that could be adopted. The Bank, the Post-office, Charing Cross, Covent Garden Market, and each railway station, might at once be fixed upon as amongst the centres in London: but routes do not now radiate from those points in direct lines; much time is therefore lost, as in getting from a place of business to the place of residence, and from and to the stations. Sir Christopher Wren's plan recognised the principle of lines radiating from centres; and the disposition of new Paris is an application of that principle to an entire metropolis.

Looking also at the plan of Paris, it would be seen, that the entire area is dotted with open spaces, chiefly circular, these being at centres of junction such as have been referred to. The Place de l'Etoile, the Rond Point des Champs Elysées, the Place du Trône, the Place des Victoires, and the Place de l'Europe are some of them. In those of most recent date, there is sameness from decorative features of surrounding houses; for, everything has been hurried on so fast, that the powers of even French architects, in design, have not been able to keep pace: but these circusses, or *ronds points*, are, no less than the oblique and radiating lines, established on correct principle. Any one who watches the traffic that crosses the circusses of Regent-street, will hardly fail to come to the conclusion, that their only error of plan is in being now too small. It has been the practice to abuse Nash for that which certainly he was not very skilful in: it has been equally the practice to neglect every lesson of street-planning, as also of architectural effect in massing of buildings, that his works abound in.

When lines intersect obliquely, and as must often be the case, at every variety of angle, a circular space is a means of mitigating what might be an eyesore. There will be at the north end of Blackfriars Bridge, such an intersection of oblique lines as we have referred to, formed by Bridge-street, the line of the embankment, and the new street to the Mansion House. The last-named line is intersected at its starting-point, again obliquely, by the London, Chatham, and Dover Railway. Yet we hear that Mr. Haywood,—who has well studied the subject, in Paris, and generally,—has great difficulty in getting his argument of the desirableness of a circus, accepted. We believe he is disposed to suggest a similar circus at the point where his new level of the Holborn Valley crossing would end westward, or where several streets including Hatton Garden will fall in obliquely, and where the great width of Holborn would suddenly commence. He has been heard to say that a monument or resting-place in the centre of such an area, is worth the services of two or three policemen in guiding and distributing traffic. The effect which may be observed, of the statue at Charing Cross, and of that at the end of King William-street, shows that such is the case.

We have no intention, however, to be led away by the present interest, and indeed importance to London, of the general subject of the planning of lines of route, from the particular subject of the architecture of Paris decoratively considered, and from the examples of structures of the domestic class. Be it only observed, that however it might be possible in a new town, to arrange concentrically the streets which are transverse, or to plan them with an obliquity to the radiating lines that would be inappreciable, and scarcely operative disadvantageously on architectural effect,—as in the case of the town of Fleetwood-on-Wyre laid out by Mr. Decimus Burton,—the matter is very different in an old city having the original lines mostly rectangular.

Thus, from all causes, there are in Paris, a multitude of new buildings on plots of ground of which the lines of two of the sides would meet in an acute or an obtuse angle. In many cases the plot has not any right angle. Wherever radiating lines are cut by a circus, the angles will be acute, or obtuse, as the circle may be small with radiating lines, many or broad in proportion to the circumference, or may be large with few in proportion; and in one of the two corner plots where one street enters another obliquely, the angles are necessarily obtuse. Of course, this characteristic of plan leads to every device of canting and rounding off corners, and of boldly meeting the difficulty of architectural effect, by placing prominent features, as balconies, in addition to the entrance, at the angle. But there is, after all, in the architecture of Paris, sameness in the treatment of balconies; whilst occasionally at the circusses, contrast between frontages, or cants, narrow in some of the cases, and broad in others, where the circus might seem to dictate symmetry, lessens the general effect.

At first, it would seem that an obliquity to the street, of the lines separating properties, must extend from end to end of the new line; but so much ground has been taken, and the whole has been so much remodelled, and the new buildings are most of them so large, that any obliquity of this extent, scarcely deserves consideration: there are however numerous buildings with two frontages, not only in cases of the houses next but one to a circus, but in those where a new street of great width has been placed between two previous streets, as the Boulevard de Sebastopol has between the Rue St. Denis and the Rue St. Martin; which streets, with the *boulevard*, run north and south. Thus where there are frontages both ways, the plot has often a twist or angle in it, midway.

From each of such peculiarities of figure, and from the necessity of economising ground, whilst getting some central area for light, there results, especially in these angle plots or blocks of building, an amount of contrivance in internal planning, for which, excepting as to one matter of detail, the French architects deserve the highest praise. The exception in our opinion to be made, is that of staircases. These most important parts of a building are planned certainly not worse than the staircases of our theatres and other public buildings, and with great show of contrivance, in the drawing; but they possess an equal or a greater number of errors of principle,—as we have once partly shown; and as we may perhaps at some convenient time, show more particularly. Still, as to the planning generally, however awkward it may be to find the way about a *suite* of rooms and passages which meet at all angles,—and though it be the fact that the original space of one room is being halved and quartered, as in the hotels for travellers, with slight regard for ventilation and health,—the planning of the French architects is most skilful in its economising of space, and admirable in its conversion, without loss of space, of the effect which oblique lines of partitions would have, into the effect of art.

The numerous plans in Mons. Daly's book, clearly show the better results of the professional skill which we have adverted to. The great majority of the plans of the "*maisons à loyer*" arranged by him for comparison, as well as many of the plans of the fully-illustrated examples, are those of buildings abutting on circusses, and bounded on the two other sides by streets in the manner described. There are also in the work, plans of some of the buildings on triangular plots, or *îslots*, of ground, which are very common. The late Professor Cockerell, in his earlier lectures, used to exhibit, as a specimen of clever arrangement, a plan of the triangular block of buildings, by Sir Robert Taylor, that formerly stood between the Bank and the Mansion House, where the Wellington Statue is now. The present professor in the Academy of course directs the attention of students to the study of planning; and, there is particular need of this, we apprehend; for, English architects do not show all the skill that is required. We would suggest to the professor, as subjects for illustration, these Parisian angle-blocks, and French plans generally. The French architect, indeed, would seem rather to delight in, and to court the difficulty of, a plot of ground not rectangular. For example, in one of the "*villas suburbaines*," a work by Mons. Hermant, in the Avenue de l'Impératrice, the house, triangular on plan, is placed in the angle of a large piece of ground which is also triangular, or trapezoidal,—the external walls, on two sides, exactly coinciding with the lines of the public footways, and the largest available space being obtained for the garden on the third side. An English architect would scarcely have prevailed upon himself to so completely eschew rectangularity. Ground, however, in a central quarter is too valuable for an inch of it to be spared, in the planning of the "*maisons à loyer*," which are the class of buildings chiefly to be found there.

The street-area to the cellars of London houses, and of the Pall Mall clubs, has no counterpart in Paris. This "ditch" (*fosse*), as they call it, immediately strikes the attention of French architects visiting our metropolis. A basement story is used for purposes of business in the case of the houses in the *boulevards*; but in that of buildings in the narrow streets, the French word *cave*, would convey to the English mind a tolerable idea of what the cellar is. Ample space is required in French establishments, for the stores of wood and wine. In the *caves* also are the "*fosses d'aisance*," receptacles now being connected with the sewers, but not intended to be wholly disused, at least until further progress in the principles of sewerage has been made. It must be recollected that the Seine at Asnières, where the outfall is for Paris, is a very different stream in width to the Thames at Barking; although, at the spot, it has the advantage of being above the tidal flow. Near the ground-line of the front of the buildings we have alluded to as in narrow streets, will often be seen a row of very small square apertures to light or ventilate the *caves*. The windows above, of the ground-floor, which may be appropriated to kitchens and to servants' rooms, are often themselves small, and fenced with iron railing. So that, altogether, there is frequently a character somewhat like that of the Florentine palaces, either arising from imitation, or from the traditional idea, or a supposition of necessity, of defence.

Of course on the *boulevard*, the giving up a large quantity of ground to the street having caused compression in planning the houses, much might be said on the question whether the effort for aëration externally, has or has not made the light and ventilation for rooms not looking to the street worse than it was. Our impression after much study of the question, is that it is chiefly where, in the central quarters, houses

* See p. 169, *ante*.

have exceptionally not been rebuilt, and where the subdivision of rooms has gone on, and in the hotels for travellers, that rooms are worse than they were before the alterations commenced. There are, however, *appartements* in many houses in Paris, which have no *through*-current of air; and this might seem to be the necessary result of the plan of buildings surrounding a court, at least as to the rooms running at right angles to the street-front. The architect visiting Paris, and looking at the structures in progress, however, will not fail to observe, where a gap to be filled up, allows the party-wall of a completed building to be seen, a small recess breaking the length of the wall, and running up the entire height. Too often this recess is glazed over at the top; but generally, it is to be considered as a ventilating shaft and additional provision to that of the space of the court. Such a recess, moreover, will have opposite to it in the next house, a similar recess. The large courts of two adjoining houses in a similar manner, may be each unenclosed on one of the sides, and placed together.

The ground story of the "*maison à loyer*" is usually made up of two, four, or more, shops or commercial establishments,—one of which is very frequently a *café*,—and of a central doorway. Where the building is of the first class, however, there may be no shops; and a *porte-cochère*, or carriage entrance, will then be substituted for the smaller doorway. An *entresol* may be said to be universal; and that window of this story, which coincides with the entrance, is almost always combined with the latter, either by the architrave of a square-headed door-case being carried up and round, or by piers supporting a balcony over the entresol-window; or, where there is an arch, by forming a tympanum of wood, decoratively treated as the doors, with a small window in it. The window referred to, generally is that of the bed-room of the *loge* of the porter or *concierge*, whose quarters altogether are much too confined, as repeatedly observed of late by writers in the French journals. Of course, in the case of a narrow frontage, the bisection of the ground by the central position of the *porte-cochère*, or doorway, would be inconvenient; the position however was persevered in, till lately, in cases where the effect alluded to, might have seemed inevitable. Some of the best examples of architecture now, are those of houses of narrow frontage, having the *porte-cochère* at one side.

In the Boulevard de Sebastopol, the doorway (usually, where there are shops, central, as we have said), is not generally an entrance for carriages; though whether narrow, or wide and arched, it is always itself effective, and most important in the whole composition of the front. The square-headed doorways, in the *boulevard*, to Nos. 2 and 4, by Mons. Davioud, with beautifully carved *guilloche* in the architrave; tablet for the number, with scroll-ornament, on the lower, and console on the upper, lintel; the door-way, also enclosing an entresol-widow, or fan-light, to No. 87, by Messrs. Gault de St. Germain, and Letrosne,—with segmental head, console and festoon, and incised ornament, and tablet again on the lower lintel, with simple, beautiful, and original wooden doors, and with an architrave formed by a chamfer having an ornament of the "water-leaf" character therein; the arch-headed doorway to No. 11 (Rive Gauche) with richly ornamented mouldings on the splay, and foliage in the spandril spaces; these may be mentioned as amongst the examples, all well illustrated by Mons. Daly; but out of the boulevard, and also illustrated in the work, is the elegant doorway of No. 39, Rue Neuve des Mathurins, by Mons. Lesoufacher, a simple arch, with an arch-volt and architrave, and no imposts or console, and having pateras separated by panels. For such compositions as the square-headed doorways, no precedents have been *copied*; and it may be questioned whether there were precedents except of doorways much less in height to the cornice, in proportion to the width of opening. Even where the ground-story, with the exception of the central feature, is devoted to shops, the presence of the feature, whether square-headed doorway, or arch-headed *porte-cochère*, saves the building from much of that weakness of appearance which the front would otherwise present, and which is usually so fatal in London to any effect from architectural treatment of stories above. In some of the "*maisons à loyer*" of the Champs Elysées, and in many other parts of Paris, *porte-cochères*, or entrances wide enough for carriages, will be found square-headed. In each of the cases, wherever they are, and whatever the form and proportion of the opening, the whole entrance is the most successful part, and often the making of the general design. The mouldings, the console, the wooden doors, the sides of the passage, or carriage-way, and the staircase; the *fontaine*, or the trellis-covered walling that terminates the vista,—and as already noticed, the very space for the enamelled tablet bearing the always conspicuous number of the house,—are all and each of them treated with originality, study, and beauty of result. Constantly is one tempted to enter the *porte-cochère*, and linger over the original details of its sides, and those of the doorways and staircases leading from it, or to pass on to the court-yard, to find an elevation as carefully, and sometimes as richly, treated, as that of the principal front. No situation, or object, seems too mean for the display of taste; and the *fontaine* alone, itself, and by the choice of its position, has generally more beauty and art about it, than could be found during the longest search at the unsightly backs of our London houses. The grouping with foliage, or only with the trellis covering of walls, seen from the entrance, is, as we have said, charming. Of the wooden doors, it may be affirmed that they display universally, result of an amount of design which is never given to such parts of a building with us. The joiner's work of English houses, may be as well framed and put together as supposed; though we have some doubts whether in this respect even, a superiority to French workmanship has not been too hastily assumed, and greatly overstated. But not only our doors, but all our items of joiner's work, are just what can be described in a specification, and will not require the trouble of a single fresh drawing; the greatest flight of taste generally ends with "*bolection* mouldings," that is the requisite number of words about them. The mere panelling of French doors, and the casements of the windows, are matters of taste and design. Some of the external doors are marvellously rich in carving. Amongst the number may be named, the doors of the *hôtel* of Mons. E. Péreire in the Rue Faubourg St. Honoré. In many doors, iron-work is effectively introduced; and in many, there are panels of coloured marbles. One of the richest doors of the last-named class, that we have seen, is that of an ordinary house in the Rue de Rennes, the street that leads to the station of the Versailles railway on the Boulevart Mont Parnasse. The singularity of Paris to an Englishman, taking the trouble to visit the outskirts of the capital, would be the fact of the universal prevalence of decoration. How far it would be correct to assume, following a writer of one of the articles in the magazines of two or three years back, that Paris, the work of the period of the present reign, has "a show face" only, may be supposed from such facts as we have instanced. Some of the best architecture may be found in new streets running from the Rue de Rennes, and the Rue de Vaugirard. The limits of any publication would not admit of representing a tithe of it.

It must however be admitted, that, throwing out the general evidence of *design*, the taste in ornament, the successful treatment of the *porte-cochère*, and some other attributes that we have spoken of, the French architecture is greatly at variance with our preconceived notions. We are reminded by the approaching opening of the Architectural Exhibition, that we have in numerous articles attempted to show the importance of a certain grouping,—especially where the case was that of a many-storied building,—and of a division of the front by its decorative features into unequal divisions, as essential to the realization of proportion. We have also repeatedly spoken of an emphasized treatment of the basements of buildings. Much of our theory would have to be set aside, were we to assume the French system as correct. The ordinary street-architecture of Paris, above the *entresol*, is remarkable for the equality of its stories; and little attention is given to grouping stories together. Of course, it may be said, the result is that the work appears what it is, a building of many stories; which last, moreover, in the buildings of Paris, are more nearly equal to one another in importance, than the stories in the corresponding case of London houses. Still we do not see that the grouping of two stories of windows in some manner together, need at all contradict the appearance which would have been given by the mere windows; the windows could hardly give anything else but the appearance of two stories.

In the basements there is not always solidity of effect. Where the ground-story is not devoted to purposes of trade, so much ground will have been given to make the ample width of a new street, or the street being an old one, will be so narrow, that there is hardly an inch of projection in lieu of base-moulding. Great cleverness, however, is sometimes shown in projections, horizontal and vertical, which are not more than the quarter of an inch. In the Rue de l'Université, and the Rue de Belle Chasse, or about the Church of Ste. Clotilde, there are numerous excellent examples of architecture of the class which is different to that of the Boulevard de Sebastopol. And the door-way or *porte-cochère*, is always most valuable as contributing to the solidity, and to the symmetry of the whole composition. The absence of much projection, or recession, in each front, excepting that effect which is given by the *porte cochère*; universal balconies; terraces in front of the attic or mansard; constant iron railings to balconies, and surmounting the cornice; and cantilevers and trusses which are inelegant in profile, are matters in which we certainly think our French brethren have something to learn, and something perhaps from us. On the other hand, it is so delightful to meet with evidence of an appreciation on the part of a whole people, of what is tasteful, as well as in the lower sense decorative and ornamental; to see that the architect-artist has thought and worked, and the artisan has seconded him; and to have so much unquestionably that is good, that the architecture of Paris can never be wanting of charm in our eyes, without considering that it is seen in all the effect and beauty of architecture,—untarnished, and with light, and a clear atmosphere; of which the want in London has been so often instanced as alone sufficient to account for deficiency of good architecture, and for lack of popular appreciation of the art.

THE BRADFIELD RESERVOIR FAILURE.

AT the conclusion of our last article we promised our readers that we would return to the serious and lamentable accident to the Bradfield reservoir. We find that our remarks have received general approval, and been extensively circulated by the provincial and local press.

We remarked on the unsatisfactory appearance of the puddle, and this may be readily accounted for from the fact of there being no suitable clay for puddle in the neighbourhood, or, at least, in sufficient quantity, as appears by the observations of a local geologist (Mr. Sorby). "With reference to the nature of the material of which the embankment was constructed, I must say that, in my opinion, if it had been made of stiff clay, like that found in some parts of England, it would not have given way. So far as my knowledge of the neighbouring country enables me to determine, no such material could be procured there in any sufficient quantity." If such be the fact, and we have it here on the indisputable testimony of a geological authority well acquainted with the district, we would ask, Why attempt to form an *earthen* embankment to support such a large depth of water, when the principal material of which such embankments should be composed, the *sine qua non*, was not to be found in the district? Again, Mr. Sorby says, "The bursting of the reservoir was not occasioned by anything connected with the arrangement of the subjacent strata." On the other hand a *local* engineer, said to be an authority, asserts,—

"In digging for the foundations of the puddle-banks, the contractor had to contend with great volumes of water issuing through the fissures of the watery strata underlying the lower part of the valley. Special engine-power had to be used to keep down the water, and a labour of somewhere like twelve months was required to cut off the streams and get a tolerably dry bed for the puddle-bank at the depth of 60 *feet*. Having made a good puddle wall, the company built their embankment with the *soil* from the sides and bottom of the valley above, thus *having the strata of the open shelving rock*. The puddle wall appears to have been sufficiently thick and strong.

Possibly a somewhat broader foundation might have been better; but I do not in the least believe that the mere pressure on the embankment of any amount of water the dam would hold could have damaged it in the least. *The complaints made of the friable nature of the soil covering the puddle bank, and forming the outer portion of the embankment, are childish.* The real cause of the bursting of the reservoir I take to be this. The rocky bottom and sides of the valley having been bared, the water, in proportion to its quantity and weight, found its way through the fissure of the rock into the courses of the springs, which proved such a serious obstacle to the laying the foundations of the puddle-bank. As the pressure became great, the water forced its way on and on, until it undermined the foundations of the puddle bank, probably at last splitting it in two, and causing the crack at the top of the embankment. A remarkable circumstance to be taken into account in ascertaining the cause is, that about nine

o'clock in the evening, the water in the dam lowered 2 feet. This appears to be inexplicable, except on the supposition that the water found an inlet into the rocks. The rending away of the outer half of the puddle bank would naturally let down the top of the embankment *outwardly, as it was, in fact, let down;* and the water then rushing over the hollow thus made, would carry away the lower part."

So it appears this company were absolutely attempting to form a large reservoir to hold 114 millions of cubic feet of water, in a district where no water-retaining material could be found, and the substrata of the sides and bottom were rock, with, it is asserted, numerous open fissures and springs in it, which fissures would probably afford a passage for the water as fast almost as it would flow off the gathering ground. Is it not known, if not, it should be, that the proper site and substrata generally selected by our engineers for reservoirs, canals, &c., are compact, close, and impervious, such that will not permit water to percolate through or escape, even in infinitesimal quantities; and that if a spring is found within its area, it is generally carefully stopped or diverted (as was the case at Holmfirth, by Mr. Leather). Our canals are lined with puddle, &c., throughout, bottom and sides, in porous strata, so that they hold water like a dish; and why should not reservoirs be so also. We hear it also announced that the works of this reservoir had been examined and passed by a Government inspector, and that, as a consequence, it is stated the company are not liable for the damage occasioned by the failure. If such is the fact, that official and the Government have incurred a heavy amount of responsibility, one we are sure that will produce a very bad impression throughout the country, and shake public confidence in the professional judgment of the official, and the foresight and sagacity of the Government. In the support of our theory that the bank gave way from weakness, and the infiltration of water and consequent settlement, we may quote from a very sensible letter of Mr. J. Ibbotson, a corn-miller, and sufferer by the calamity. He says,—"The information was brought by S. Hammerton to G. Swinden, the company's foreman, about seven o'clock. We could trace with our light a crack running in a horizontal direction a distance of 40 or 50 yards along the embankment on the outer side, at a distance of 14 or 15 feet from the top. I said, What is the cause of this crack? G. Swinden and others were of opinion that 'it was caused *by the inner part of the embankment between the puddle-wall and the water subsiding a little owing to the water penetrating in,' and in consequence the top of the embankment inclined over towards the water.* At that time the opening would only allow of the fingers being inserted in the widest part. The double set of pipes which were in working order for drawing off the water were closed, and the water was a few inches below the level of the wash-weir. I said: Let us draw off the water as fast as the pipes will allow. It was a work of great labour for four or five men to raise the sluice by means of the screw, as well as some danger from the tremendous pressure of water, and the noise and tremour of the pipes when the sluice was being lifted were terrific. I went from the pipes to examine the crack, but perceived no change; and I observed that the level of the water was considerably lower on the inner side of the embankment than the crack on the outer side. I could not perceive any sign of leakage of water, but, owing to the darkness, we could form no idea as to whether the embankment was either sinking in any part or changing its contour." A few minutes before 12, they heard a shout and the roaring of the flood. It should be understood, that the reservoir was only filled on the 11th of March, and failed as described the same night. We think the evidence of this circumstantial observer and eye witness as to the early stages of the failure is conclusive against the theory of the leakage through the strata of the sides and bed of the reservoir, and the passage of the water under the puddle (60 feet deep) and seat of the embankment. It appears such leakage takes place at Rivington Reservoir, and passes under the embankments without doing any injury, or any attempt being made to stop it. But what would incline the top of the bank inwards, and necessarily open a crack on the outer side, but the pressure of the water inside the reservoir, filtering into and consolidating the inner part of the bank, carrying away the insufficient puddle (if that could be called puddle that existed) with it. We have also the evidence of another competent and practical person in support of our assertions, and line of reasoning, Mr. J. Drinkwater, a manager of water-works, He says,—"The sustaining bank of the dam, which is about 90 feet high, ought to have been 570 feet broad at its base, or in other words, have had an internal and external batter of 3 to 1 instead of 2 to 1 as at present, which would have left 30 feet for a footpath; also the waste weir should have been 180 feet long (120 feet longer than at present), besides increasing the diameter of the discharge pipes from 18 inches to 36 inches each. Instead of the earthwork being put together in consecutive layers of 3 feet at a time, and each layer being completed before another was laid on, it appears to have been rapidly executed, without the least attention to workmanship or consolidation. On examining the puddle wall in the centre of the bank, I found it both too slender in dimensions and too slight in workmanship. In order to resist the pressure resulting from such a depth of water, the puddle trench should have been 30 *feet* at bottom, and gradually diminishing to 15 *feet* at top, under the sod of the foot-path, being about 10 feet stronger than the present one at the surface. Instead of the puddle being joined to retentive earth at the foundation, and extremities of the bank, I found that an attempt had been made to attach the same to the soil, after the grass sod had been removed for about 3 inches in thickness. If this sample, which I observed near the waste weir, is a specimen of the whole, I am not surprised at Bradfield Reservoir, for unless the puddle which forms the water-tight part of the reservoir be united to good resisting earth, the water will undermine the foundations and ultimately cause the bank to give way. In addition to this, the clay appears to have been thrown into the trench regardless of any rule whatever, in lieu of being converted into puddle by being put together in 12-inch layers, and working each separate layer down to 9 inches, until it is finished. This plan was adopted in the foundation of Todd's Brook Reservoir, which I inspected in conjunction with the late Mr. Wood. This reservoir belongs to the Peak Forest Canal Company, and covers an area of 60 acres, with a cubical content of 47,412,270 feet. I adhered to this method when our two double three-banked reservoirs were made in 1839 and 1848." We quite agree with the principal part of these observations, and are glad to find that in the main they support what we have advanced, viz., that the bank was considerably too weak to support the hydrostatical pressure of the water, and composed of improper material; the puddle too weak, non-resistant, and badly made; and the provision for discharge of superfluous waters quite inadequate for the accumulations of so large a gathering ground after heavy rains and melting snows. If the theory suggested that the water of the reservoir escaped by fissures in the strata of rock at the bottom and sides be well founded, it does not set aside the ugly fact of the embankment being totally incompetent for the purpose for which it was intended; and arriving at this fact both by comparison, practical observation, and experience, and by the usual scientific formula adopted for ascertaining hydrostatical pressure, viz., by multiplying the area of the surface immersed in water in square feet by the depth in feet of its centre of pressure below the surface of the water, and by 62½ pounds, the weight of a cubic foot of water, and in comparison ascertaining the cubical contents and weight of the earth composing the embankment above that point, it would satisfy any unprejudiced person that the embankment was too weak to sustain the pressure, and as a necessary consequence failure was the result. This theory of the escape of the water by the crevices in the rocky strata is something like R. Stephenson & Co.'s theory of the "*side blow.*" When the iron compound girder bridge, on the river Dee, Chester, failed under a passing train and many lives were lost, that theory was strenuously advocated and supported by many scientific men; but, nevertheless, it was miserably confuted and brought to grief by a few searchers after truth and subsequent experiments, published in our journal.

But the cream of the affair was, that although the principles contested were asserted to the last to be good, the remaining part of the Dee Bridge was propped up, and all other bridges of similar construction on other railways were also propped, showing that in that instance *theory* was lamentably at fault.

In our search for truth, in that case, we have reason to believe we "did the State some service;" and in the present case also we have endeavoured, by bringing judgment and experience to bear, to enlighten, to the best of our ability, the minds of the public, and to show the cause of this accident, so lamentable in its consequences.

We omitted to mention in our last, that the Bradfield Reservoir was commenced on the 1st of January, 1859, and that it was filled on the 11th of March, and failed about midnight of that day. In addition to the supply of the inhabitants of Sheffield, it had to allow the mill-owners on the Loxley 10 cubic feet per minute, as compensation for the loss of water.

We are collecting information on the subject of large reservoirs that have been constructed in various parts of the country, and may have something to say on it.*

FRENCH AND ENGLISH ENGINEERS.

A PAPER on the organization of the *Corps Impérial des Ponts et Chaussées* in France was read at the Society of Arts on the 16th. In the course of it the reader said, one great cause of the efficiency of the service of the engineers is, however, to be found in the body of conducteurs, or clerks of the works, whom they employ, and who are engaged upon the field operations, the superintendence of the workmen, the measurement of the works done, and the preparation of the drawings that are sent out from the engineer's office. The nomination of these men is rather singular, and takes place somewhat after this fashion:—The engineer receives a young man into his office, without salary at first, and he brings him up to the details of his business: at a certain time the men present themselves for examination as conducteurs, and they become embrigadés if they can pass that ordeal, which is made to embrace the whole range of sciences that are concerned with the practice of civil engineering, such as geometry, the theory of numbers, logarithms, the drawing of plans, levelling, taking out quantities, measuring work, the superintendence of it, and generally all that would be required for carrying works into effect. They become then conducteurs embrigadés de 4me classe, and they pass through the ranks of the third, second, and first classes, in the order of their seniority generally; but they may mount in grade more rapidly, in proportion to their merit or their patronage. By the law of the 30th October, 1850, it was provided that the sixth of the places of the engineers should be reserved to the conducteurs that had been in the service for the space of ten years, and who could then pass the examination that the engineers were subjected to; but this provision has hitherto been perfectly nugatory, for since its promulgation there has not been a single promotion from the body of conducteurs. The utmost they can aspire to is to be allowed to perform the functions of a civil engineer, whilst they retain their old rank. They would be regarded as intruders if they forced themselves into the society of engineers, as the equals of the latter, by taking advantage of the letter of the law. The consequence of this state of affairs is, that the pupils of the Ecole Polytechnique have practically the monopoly of the Government employment in the place of the Ponts-et-Chaussés, for the conducteurs do not aspire to that title, let them be ever so learned or ever so capable; and thus the French revolution has perpetuated the inequality of conditions, by giving the monopoly of the profession to those that can afford to pay for the education that is given in the schools—a strange commentary upon the doctrines of equality that the revolution was intended to inaugurate.

There is a very great inconvenience arising from the strictly theoretical style of education that the young engineers are called upon to go through, that consists in the desire the bulk of them possess to distinguish themselves by the construction of works of a monumental character, without any regard to the conditions of economy that would be applicable in the majority of cases. The principle of the French law is, that the architect is responsible for the solidity of the building that he may put up, against any defects of construction or erection, for the period of thirty years; and though the Ingénieurs des Ponts-et-Chaussées do not come under the strict application of the law, owing to their not working for a commission, yet the tendency of the law is to produce a great degree of strength, and a solidity of execution, that may be traced in all the works they execute. The administration

* Errata, in last, for "Ogden" Brook, read "Agden;" and for "coal" engineer, read "canal" engineer.

requires, in addition, that no work should fail: the engineer that risks much is looked upon as a dangerous and troublesome man. There is every inducement, therefore, for the engineer to erect "monuments," and the character of the works of the Ponts-et-Chaussées is marked with the grandeur and the magnificence that was formerly the distinguishing mark of the Roman engineers; but the cheap and expeditious systems that prevail in England and America are regarded with dislike and contempt. One other objection may be made to the French system, in the total absence of original thought that it developes. The best subjects, as they call them, are obliged every year to travel in foreign countries, and the works that are done in France are generally the productions of civil engineers and the somewhat despised race of architects. The Ingénieurs des Ponts-et-Chaussées do not attempt to produce any new style—they only seek to construct "monuments" that shall last for ever, regardless of cost. The tendency of the body of the Ponts-et-Chaussées to this style of work is also, to a great extent, assisted by the publication of a journal of the body, that appears about six times a year, under the name of the *Annales des Ponts-et-Chaussées*, and is characterised by the excessive love of theory, and the abuse (if I may say so much) of mathematical and other scientific knowledge, that may be reproached to the whole of the present school of French engineers. The members of that profession who communicate the information that is inserted in this journal, are, in fact, obliged to treat every subject which they undertake in the most abstract manner, as though they constructed or designed works for the sake of resolving problems of science, instead of endeavouring to answer the questions that might arise with the purpose of constructing the works economically: they cultivate science as the end of their labours: they do not look upon it as the means to the end. The same observation may be extended to the bulk of French scientific works, whether they be brought out by the Ingénieurs des Pont-et-Chaussées or by the ingénieurs civils, for the latter are obliged to follow the example set by their rivals, and to employ a great amount of science on the simplest operations of their pursuit. Yet there is a great advantage in thus substituting the indications of theory for the rule-of-thumb processes that are still too prevalent here; and the contrast that is presented between the French engineering journals and the English productions of the same kind, is but little to the credit of our scientific and practical men.

The ultimate consequence of the strict system of promotion that prevails in France is, that all that relates to the general direction of the public works of that country is obliged to be transacted through the body of the Ponts-et-Chaussées. . . . The distinction between the Ingénieurs des Ponts-et-Chaussées and the conducteurs is a permanent and ineffaceable one, that will always be a standing reproach to the system that would prevent a man from rising by his own merits to the foremost ranks of his profession.

Yet, although I am myself fully aware of the inconveniences of the French system of organizing the public works of that country; though I know the great expense that the nation is put to on account of the want of practical knowledge, and from the deficient technical education of the engineers that the Government is obliged to employ, from the fact that no man can there rise from the ranks, let his merits be ever so great, and from the mania that the system fosters for constructing monuments that should last for ever; yet I have seen such confusion and such waste occasioned by the system that prevails in England, especially in the appointment of Government officials in similar matters, that I should be almost inclined to prefer the French system of the Ponts-et-Chausées to the ignorance and incompetence that prevail here in Government offices. The engineers of the Ponts-et-Chaussées are thoroughly acquainted with the subjects they have to pronounce upon, and they all feel as though the reputation of their body were entrusted to their safe keeping; whilst in England the nomination of the engineers of the Government is entirely regulated by favour and caprice.

In the discussion that followed, Mr. Haywood (engineer of the City Sewer Commission) said he did not gather from the paper that Mr. Burnell held any conclusive opinion as to whether the system in France was better than that in England, or the reverse. With a great deal Mr. Burnell had said he fully concurred, but the root of the whole question of the organization in this country of a corps corresponding to that of the Ponts-et-Chaussées lay in the political condition and habits of the people. Whether it would be desirable or not, there was little probability of its being done in our time. He must confess that being tolerably well acquainted with France and her institutions, he never went there without regretting that some system could not be established in this country by which more unity of action in engineering matters could be obtained, especially with regard to the metropolis; but he could not see any intermediate condition between the present local-government system and the institution of a corps somewhat similar to that of the Ponts-et-Chaussées. If that corps was tested by the grandeur of its works, it was far in advance of the English: on the other hand, if the results were tested by the activity of commercial enterprise, then the French system was far behind ours. They had then to choose between the two. With regard to the works of the engineers in France, his conclusion was that their aqueducts, docks, high roads, and canals, were laid out better than our own, and also that the workmanship in them was superior to ours. With regard to the originality of their works he did not feel he could give an opinion. As to their scientific investigations he was inclined to place a higher value upon them than Mr. Burnell had done. Undoubtedly the first series of engineering publications he was acquainted with was the *Annales des Ponts-et-Chaussées*. He knew nothing in this country approaching them; and they formed a scientific literature of which any nation might be proud. There was one thing he could fully endorse,—that was the very high tone of honour amongst the engineers themselves. Their official pay was exceedingly small; but he believed a body of men with a higher professional tone did not exist. They did not aim at acquiring large fortunes, inasmuch as scientific men generally got in France that which they could only obtain here by becoming wealthy—they got high honour and social position. He happened to be at the New Year's levée of the Emperor, and he then inquired what was the precedence of the Corps des Ponts-et-Chaussées on such an occasion. He was told that the engineers took rank before colonels in the army, which was an evidence that their standing was fully acknowledged. But that was not the case in this country. There were brilliant exceptions, such as Faraday, and some others, who, although they never sought for wealth, were still so distinguished that they could not be overlooked; but the great mass of professional men in this country were generally measured by the depth of their pockets. That was why they struggled to make money as quickly as possible, because money was the passport into society. The engineers of the Ponts-et-Chaussées had an entirely different tone of feeling. He knew many of them personally, and could speak of them in the highest terms. There was one remark in the paper about the architects which struck him. He understood Mr. Burnell to state that they were responsible for what was called the well-designing of their work for a period of thirty years. The period was a long one, but he thought it would be a wholesome thing if some such rule were acknowledged in this country. It was true, a man was responsible for what he did, because, if he did not perform his duty, remedy might be had against him at law; but most persons would rather bear the loss than have recourse to the remedy. Then, again, the French system had its disadvantages. All those who practised as engineers in that country must have gone through the Ecole Polytechnique, and thus have been in some measure educated by the State, and so become naturally subject to State control. After all he felt that he could not say with certainty which system he preferred, there were so many elements involved in the question; but he would say he never went to France without coming back bitterly regretting that our present system did not, with our huge wealth and great commercial enterprise, produce results more worthy of the nation. If a few remarks on a subject, now becoming one of great interest in this country, were not out of place, he would say a few words as to the system of subways formed in Paris, which would serve as an illustration of the great care with which such works were carried out in France. His remarks would apply to Paris, Lyons, and other large towns. In the whole of the internal arrangements of those towns the French were beating us hollow: they were building better houses, forming better thoroughfares, putting up better lamp-posts, giving more light, and in all arrangements which affected the health of the community they were considerably in advance of this country. With regard to the main sewers of Paris, they were built in a style of magnificence which might be expected from a body who were not limited as to expense. He was one of those who thought the public works of large cities ought to be monumental, and not merely for the present generation. Surely it was an unworthy feeling that it was sufficient to carry out works which would last our own time, leaving posterity to take care of itself. That was part of the money-greed of the age; and in that respect our public works contrasted unfavourably with those of Paris. The large intercepting sewers of the French capital were made with footways on each side. Those along the Rue Rivoli and the Boulevart-Sebastopol were so large that a full-sized man could walk on the footway on either side with his hat on, so ample were the dimensions of these sewers. They were kept in a state of cleanliness that was surprising. The entrances were made highly ornamental, which he thought superfluous. The steps which led down to them were wide enough for two persons to descend side by side. A railway ran along the edge of each of the footways of the large sewers, and below that was the invert forming the sewer proper. An exceedingly well-devised apparatus travelled up and down this railway; and mechanical scrapers were used by which the bottom of the sewer was constantly cleansed. The whole of the gas and water pipes were covered with a black varnish or bituminous compound: it was true there were leakages, but very few. The smaller branch sewers were most of them 6 feet in height, and on each side of them might be seen porcelain figures marking the house-drains, with a small piece of white enamel about an inch square, which indicated that the proprietor of a particular house paid three francs annually for keeping his private drain clear. Everything was carried out on the same scale. When they contrasted this with the way things were done in London, without entering into the political question, with which he had nothing to do, but looking simply at the material results as they were presented in the capital and large towns of France, it made us ashamed on looking at our own metropolis; and when one knew as much about the expenditure in London as he did, as compared with the wealth, he must come to the conclusion that there was no town in France in which the inhabitants relatively to their means spent so little in keeping their city in decent and proper order as they did in London.

Mr. E. C. Tufnell remarked that the direction of the observations just made was altogether to depreciate English engineers below the French. He did not agree with that position, because there were many facts which went in contradiction of it. When the French desired to introduce any new engineering practice they almost invariably came to this country for the assistance of engineers. When railways were first commenced in France they sent for Locke and other English engineers to carry them out. We were the first country to introduce suspension-bridges. The French sent a deputation to this country from the Ecole Polytechnique to inspect what we had done. They returned to France, issued an elaborote report, stating that our suspension-bridges were erected upon wrong principles, and devising (as they thought) better ones. They erected a suspension-bridge in Paris, on their principles, but immediately upon its completion it tumbled down. Then, again, with regard to the Suez Canal, notwithstanding the predominance of French influence in Egypt, the Pacha sent to this country for engineering advice with regard to that project, and Mr. Hawkshaw went out to that country to make a professional report upon that great undertaking. Looking at these facts, he could not at all reconcile them with the views expressed by Mr. Haywood.

Mr. Frederic Lawrence said he did not feel the same difficulty that Mr. Haywood felt, as to which system he preferred. As an Englishman, he approved of a system which allowed talent to develop itself—by itself,—rather than a centralised system which tended to cramp the energies and fetter the originality of those employed; and he thought, if they compared the engineering works of this country with those of France, looking at the works themselves, they would see at once that our system was by far the best. Could the French engineers point to a Britannia Bridge? or, if they had anything resembling it, did they not copy it from us? Was not every

large engineering work in France a copy or modification of something previously done in England? He was surprised to hear Mr. Haywood speak so approvingly of the sewers of Paris. It might be that the sewer along the Rue Rivoli was better than anything we have in London; but why was it better? Because the French engineers came over here and saw what we had done: they adopted what we had done well, and improved where they felt they could improve. It was, however, only recently that sewers had been introduced into Paris; and, if that system were carried out all over the capital,—as was stated, regardless of expense—Paris might eventually be a better drained city than we could boast of. With regard to some of the details, he did not think Mr. Haywood, with whatever staff he could command, would care to have put upon him the task of fixing up the tablets he had spoken of, in the city sewers, indicating the numbers of the drains, and the sum paid by each private individual to have his drain kept clean. He had no hesitation in saying that, in his opinion, however admirable an institution the corps of Ponts-et-Chaussées of France was, it bore no comparison with the engineers of England; because, when he looked round, he saw the names of engineers who had carried out works which the corps of Ponts-et-Chaussées dared not have attempted. He, therefore, differed from Mr. Haywood; and had no hesitation in pronouncing the English engineers the first in the world; for, when any country was in difficulty, England was applied to for that valuable engineering counsel which could be obtained from no other country.

Mr. Haywood explained that his remarks had been misunderstood. He had dealt only with the broad features of the paper, and he had made no comparison between English and French engineers, as regarded their professional skill.

Mr. Lawrence understood Mr. Haywood to refer to the question of the two systems, and they must judge from the results whether one was better than the other.

Mr. Burnell said he had carefully guarded himself in what he had said against drawing comparisons between English and French engineers. Upon the question of the relative merits of the two classes, it was a singular fact that the French engineers had almost invariably consulted the English, and all the inventions that had altered the face of engineering science had arisen either in England or America. With regard to railways, it was well known they originated in England, and the same thing occurred with reference to suspension bridges. The merit of that form of bridge they knew belonged to Telford. Steamboats, the electric telegraph, and many other inventions, which had tended to advance civilization, were the results of the free-trade principles which prevailed in England, and of which he was a cordial supporter. The object of the paper was to call attention to the organisation of the corps of the Ponts-et-Chaussées, which he thought, for carrying out works necessarily in the hands of the Government, was superior to our system of appointing Government officers.

The Chairman (Mr. G. F. Wilson), in proposing a vote of thanks to Mr. Burnell, said he thought they must all, to a great extent, participate in the feeling expressed by Mr. Haywood, on comparing the style of the public works in Paris with those of London; and with regard to the sewers, if anything was calculated to mitigate that feeling, it was, as far as he was personally concerned, in the visit he paid to the great brick tank at Barking, covering an extent of eleven acres, which, for strength and excellence of execution, could hardly be surpassed, and which showed what could be done in England in the way of first-rate brickwork. He was afraid they could hardly expect to settle the question this evening as to the comparative merits of the two plans, and he thought they must be content with supposing that each nation had settled down instinctively into the particular system which best suited its own peculiar constitution.

PUBLIC WORKS AT HYDE AND DENTON.—The Local Board of Health at Hyde have made arrangements with the Public Works Loan Commissioners to borrow 14,000*l.*, which it is intended to lay out on an extensive system of sewerage. In Denton the authorities are expending 4,500*l.* in a similar manner, and are giving work to a large number of unemployed operatives.

THE LATE MR. RICHARD ROBERTS.

THE majority of those who are our readers, in or out of Lancashire, will at one time or another have taken some interest in the machinery of the cotton-manufacture. At the two International Exhibitions, there were few persons amongst the crowd, more interested in the working of the self-acting mule, than the members of our own profession. Mechanical engineering is separated by no defined line from civil engineering, more than the latter from what may have been considered the province of the architect. Naval architecture has usually been considered quite separate from what has been distinguished as civil architecture, which includes engineering; but civil engineers are now the naval architects.

The name of Mr. Richard Roberts, who was the author of that beautiful contrivance the self-acting mule, who touched and adorned each of the departments of modern engineering, and who invented machines that are of much importance in the construction of buildings in which iron is used, should not be left without a record in the pages of this journal. As the inventor of the Jacquard punching machine, for perforating rivet-holes, Mr. Roberts aided essentially the accomplishment of that great triumph of the combined efforts of many minds and hands, the Britannia Bridge; as he also aided it in other ways. The machine had its part in the realization of the more extended work, the Victoria Bridge, over the St. Lawrence, Montreal. This invention was followed by one of a duplex machine for punching holes for rivets, in angle-iron. The whole course of his life however was devoted to the invention of labour-saving tools and machinery, contrivances such as the authorship of them should procure the inventor similar credit for benefit conferred, to that which has been said to be due to him who causes two blades of corn to grow in the space where there had been but one. Mr. Roberts however only realized the return of too many inventors. Having made the fortune of some of his associates, and contributed,—if political-economists are to be respected, and facts taken,—to the welfare of a large increment of the population of England, he had gained at the time of his death, little but his reputation as an inventor, and a recognition of his merits in the shape of an all but realized provision for him by his friends. Before a sum that had been raised, could be applied to the object, and on the 11th inst., he died, being in his 75th year.

The biography of Mr. Roberts is full of interest, like the lives of most inventors with him, who have worked their way from humble origin. He was born in the parish of Llanymynech, near Oswestry, in Wales, on the 22nd of April, 1789. In this locality there are still mementoes of his inventive tendency and ability. He left his native place however, early, and in order to escape service in the militia. He got to London, where he worked in Maudslay's manufactory. He must have been young, perhaps not much more than twenty-one, when he was in Manchester, where, according to an account given to us by one who there assisted him afterwards in his avocations, he first procured employment in turning a wheel and thus furnishing what was the motive power of the machinery of a small engineering shop. The proprietor of this concern recognized Roberts's ability, but soon died. After that, it is said, Roberts married the widow, and became proprietor of the place. The Sharps, who were at the time dealers in iron, or in iron-manufactures, rather than machinists, appreciated Roberts's ability; and eventually, a partnership was formed, which became the firm of Sharp, Roberts, & Co., of the Atlas Works, celebrated throughout the world.

From about the year 1817, Roberts produced the planing-machine (now in the Museum of Patents, South Kensington), the slide-rest, slotting-machine, machine for cutting teeth of wheels, lathes, and self-acting tools of many kinds. These inventions and improvements, as it has been remarked, have contributed to the production since, of every species of mechanism, from the marine-engine to the railway-ticket press and the sewing-machine. The self-acting mule was an invention consequent upon an application to him, by master spinners, after the Staleybridge riots. On the introduction of railways, the firm became large makers of locomotive engines. Of these, 1,500 have been produced at the Atlas Works. Their manufacture was greatly aided by the use of standard templates and gauges, which had been applied by Roberts in 1825, in the manufacture of the mules. The system is the same as that now used for the Enfield rifle. A factory at Mulhouse, gas-meters, silk-looms, electro-magnetic apparatus, a balance (with moveable fulcrum) for weighing the proportions of metal to compound an alloy, and an improved form of windlass, were amongst his other works of various kinds. He also made turret-clocks. He gained a medal for one in 1851.

After some years' duration, the partnership of Sharp & Roberts was dissolved; and Mr. Roberts commenced a new concern in connexion with Mr. Fothergill and another person. This, however, does not seem to have answered; and Mr. Roberts, of recent years, was resident in London, where he practised as a consulting engineer. Here, he devoted much attention to the question of steam-navigation, and propulsion by the screw; and we believe it is recognized that independent credit is due to him for the suggestion, exhibited in model, of the two screws each worked by a separate engine, as well as of the two keels, the whole together being calculated to serve the efficient manœuvring of steam-vessels of war. In some of these and other inventions applied to ships, Mr. Roberts was concerned with Captain Symonds. The advantages of the twin-screw and double-keel system; and of the substitution, for outrigger < brackets of attachment of the screw, of screw-shafts led through trunks which are under the quarters and firmly secured to the bottom by vertical webs, were very clearly explained by Captain Symonds, at the session last year, of the Institution of Naval Architects.* As Mr. George Rennie has an independent claim to merit in connexion with the twin-screws, it may be well to quote from the Transactions of the Institution, what was said by Mr. Fairbairn at the last session. After alluding to defects of Captain Coles's system, from the liability of the cupolas to get jammed or crippled, he said:—

"These are considerations which appear to require careful attention on the part of Capt. Coles and the Government, before the plan is tried and confirmed, as the application of twin screw-propellers by Mr. Richard Roberts and Capt. Symonds, appears to introduce an effective remedy for these evils. On this principle, the ship can manœuvre in any direction, and to any extent; by reversing the motion of one engine, the vessel can be turned round, with the whole of her broadside, in about the same time as the cupola with one or two guns. This power of motion in any required direction appears to me to be a desideratum in manœuvring ships of war, and is well entitled to the consideration of the Admiralty, at a time when science and its practical application may place the navy of England on a principle in advance of every other nation."

Mr. Roberts's name also, in connexion with a form of "non-fouling" screw, and an improved method of stepping and securing iron masts, was referred to by Captain Symonds at the same meeting.

Roberts's machinery was so remarkable for its perfect accuracy of fitting, that that which was really a merit, has been often spoken of in Lancashire, as though a fault. Proper attention being given in oiling and cleaning, such machinery would last all the longer; but then it was said, if machinery lasted eight or ten years, that was enough, since improvements were made in such periods, and it would be better to have new machinery with the improvements, than retain the old. It was thought therefore that more margin might have been left; and that, so, any carelessness, or dirt, would not have frequently entailed stoppage of the machinery. Mr. Roberts is mentioned in Smiles's "Lives of the Engineers," but with some errors as to facts,—those who knew him, tell us. We have therefore trusted to recollection, and to the information of friends, for such particulars as we have given.

THE BASILICA OF ST. CLEMENT, ROME.

THE researches in the ancient church, now subterranean to the more modern one of *San Clemente*, still continue, and supply proof that the whole interior, walls and pilasters, must have been originally covered with polychrome decoration. Among the many paintings of Scriptural and legendary subjects hitherto brought to light, the last-discovered are about the most interesting,—indeed, beyond comparison, the most valuable records of the school that flourished in Rome between the period of the Church's perilous retreat in catacombs, and that of the revival of art and intellect in the fourteenth

* "Transactions of the Institution of Naval Architects. Vol. IV. 1863. Office, 7, Adelphi-terrace, London." 4to. Pp. xxii, & 302, and table. Ten plates, & cuts.

century;—in painting, at least, almost the only important relics from the art of that interval, though in the department of Christian mosaics the treasures left by Mediæval schools are numerous in this city.

It is to be remembered, that the present conditions to which has been reduced the primitive church of St. Clement are ascribable to that fatal conflagration caused by the Normans, under Guiscard, in 1084, which swept over and totally devastated the entire region between the Capitol and the Lateran, where the antique basilica, with its convent (now of Irish Dominicans) is situate; and the more modern church is supposed to have been built very soon after that catastrophe, over the ruins which were thus concealed,—left buried, in fact, and forgotten for ages, under its structure. The last-discovered series of paintings are on a wall-surface above the actual façade, and seem to have belonged to the decoration of the narthex; these being indeed the most valuable, and of such merit in style and composition, that it may be inferred their discovery will be remembered as an event to lead to some modification of theories respecting the conditions of art before the Renaissance, or the precise period of its last and deepest decline in the so-called "dark ages." We here see illustrated the poetic legend of the martyrdom of Pope St. Clement, on the coast of Cherson, or the Crimea. After working as a slave with other Christian victims, in the stone-quarries, he was drowned in the Euxine Sea; but his body was miraculously preserved in a splendid temple built under the waters by angelic hands! And every year, on the anniversary of his death, the waves retreated, leaving a passage along dry ground for the faithful to visit and worship at that mysterious shrine! Once (according to the fable) it happened that a mother brought her young child with her on this solemn occasion; and, returning, left the boy in the temple, imagining he had followed with other children brought by parents to join in the same devotion. To her agony she found that the sea had flowed back, submerging, before she could retrace her steps to, that martyr's shrine. On the next anniversary, she returned, entered with other worshippers, and there, to her unspeakable joy and astonishment, lay her lost son asleep before the tomb, unscathed, and unconscious, till he awoke in her arms! This story is represented in three distinct scenes. On one side is an external view of the city, with the name *Cersona* over a gateway. From it is emerging a procession of worshippers, headed by the bishop, in sacred vestments, with the crozier, but no mitre on his head. In the central compartment is the temple, like a fantastic pavilion, supported by slender pillars in the midst of the sea, here indicated by an ample wavey surface bestrewn with large fishes. Within appears an altar, having two lighted tapers on its *mensa*, and three lamps suspended above. Here we see the figure of the mother twice, in different actions,—first bringing in her child, and again discovering him asleep before the altar, where she kneels, as the boy awakens, to leap into her arms,—an affecting scene expressively rendered. Above the mother's figure are the words written in form of a cross, *mulier videca*. Below this picture is the inscription explaining its subject: "*Integer* ECCE IACET REPETIT QVE PREVIA MATER," —wanting only the first four letters here supplied; and, in a lower compartment, another group evidently intended for the family who ordered this picture as a pious offering—a father and mother, a little boy and a girl, led by another female, each carrying a peculiarly-formed taper, no doubt to offer at the altar,—the names of all being written beside the several figures:—*Beno, Domna Maria, Puerulus Clemens, Attilia, Ge*, the last incomplete. In the midst of this group, within a circlet, is the half-length figure of St. Clement, holding the sacred volume, and raising one hand to bless; a large nimbus round his head, his countenance remarkably noble, and full of apostolic benignity,—the features finely regular. Below, the epigraph, in Leonine verse, "ME PRECE QVERENTES ESTOTE NOCIVA CAVENTES;" and laterally to the group, another inscription, which may be read (filled up in its sundry abbreviations) as follows: "*In nomine Domini ego Beno de Rupiza pro amore beati Clementis et redemptione animæ meæ pingere fecit*" (*sic*). That this family, here represented by Beno de Rupiza, its head, was noble and belonged to a period in the eleventh century, and that the pictures executed by their order in this church may be referred to the latter years of the same century, is the conclusion to which Signor De Rossi arrives in his interesting report on the last discoveries at S. Clemente (*vide* the "Bulletin of Christian Archæology" for January). Higher on the same wall surface must have been painted another composition belonging to the series, lost by the demolition of this part to give place to the modern building above; and that its subject was the miraculous preservation of St. Clement's body in the temple, is evident from the extant inscription, much injured, but easily restored as follows:—"*In mare submersum tumulum parat Angelus istum.*"

In another part of the same subterranean church has been recently found the hitherto-covered half of a picture whose other moiety had been brought to light some time previously, and whose subject is clearly explained by the words legible below, as the transfer of the body of St. Cyril from St. Peter's to this church, where his tomb has been reached in the course of the works now progressing. This saint was a celebrated Greek missionary of the ninth century, who was sent from Constantinople to preach the Gospel to the Slavonians, ultimately settled at Rome, where he died, and was interred with great honours. In the funeral procession here represented, his body is carried on a bier, in pontifical vestments, the head still crowned by the nimbus: a pope, walking between two bishops, and several other ecclesiastics follow, one of the prelates, as well as the pope beside him, also distinguished by the nimbus; and among sacred symbols appear two croziers, a large jewelled cross, and three standards, consisting of banners pendant from small crosses, in form like the *labarum* (the only instance of the introduction of this last in any known paintings of very early date): beside the bier, are two thurifers swinging large censers of globular form; and, near its head, walks a female, whose dishevelled hair and vehement action seem to express the most passionate grief. At the picture's right side, appears another subject, distinct in itself, though not divided from the former,—the celebration of Mass by the same pope at a low altar, on which lies an open book with certain words from the Roman liturgy still in use; but no ornament or symbol, neither cross nor tapers are seen. Pendant lamps alone illuminate the rite, hanging from a species of aedicula, perhaps meant for a perspective view of this church's interior, the three narrow arches here introduced to represent its division into nave and aisles. The inscription below may be read (with some restoration).

The figure distinguished by the nimbus, walking beside the pope, may be the brother of St. Cyril, Methodius, also revered as a saint; and the pontiff himself, Nicholas I., elected 858, and canonized, who was the first to encircle the papal mitre with a regal diadem, as in fact here represented, wearing a tiara of a *single* crown, which he is said to have assumed in sign of *temporal* sovereignty. In this picture, therefore, we have the earliest extant representation (as De Rossi has shown on sufficient grounds) of the original pontific tiara, long before that prouder symbol, the *triregno* (or triple crown) had been invented. As to costumes, we are reminded by these groups generally of the Classic, rather than the Mediæval, excepting, indeed, the ecclesiastical personages, whose vestments are almost identical with those worn at the altar still. The rest are clad according to fashions that may be considered early modifications of those proper to Classic antiquity. The *paterfamilias*, named Beno, wears a tunic reaching to the knees, a mantle clasped over the right shoulder, like the antique lacona, and short beard with moustachios: the females are in vestments of ample folds, flowing down to the feet, with hair low on the head, parted over the brows, and in some instances (as the Maria, Beno's wife), a short veil added to the other details of a dress remarkable for graceful simplicity. The modest style of sacred ornaments, where any sanctuary is represented, and the absence of images, even of the crucifix, convey tacit reproach against the tawdry and theatrical decorations now fashionable in the Italian church. Copies of all the more noticeable paintings among this series have been taken by order of the worthy prior of the Irish Dominicans, Father Mullooly, who has sustained the costs and risks of the excavations here in a manner entitling him to general gratitude; these copies, to be presented to the Pope, executed by an artist named Ewing, of English descent, though Roman by birth, with skill and fidelity are deserving of praise. As to the colouring of the originals, one is struck by its surprising freshness, and by a certain degree of harmony. The drawing does not, indeed, indicate much knowledge of anatomy; but the draperies are, for the most part, well designed, many of the countenances full of earnest character, some beautiful; perspective, in the architectural details, about as defective as is generally the case in the art of the fourteenth century. The above-mentioned, and most of the other compositions, those more complicated at least, hitherto uncovered in the researches on the spot,—as the mass of St. Clement, the story of St. Alexius, the group of the first successors of St. Peter,—are obviously of the same period, and may be inferred to be by the same hand.

Rome.

THE MOSAIC WORK IN WOLSEY'S TOMB HOUSE, WINDSOR CASTLE.

SIGNOR SALVIATI is proceeding rapidly with the enamel mosaic work in the vaulted roof of Cardinal Wolsey's tomb-house, Windsor Castle, under the directions of Mr. Gilbert Scott, R.A., for Her Majesty the Queen. The surface of the panels to be covered by the mosaic work is upwards of 2,000 square feet, and more than a half of the whole is already fixed.

The cartoons have been designed and drawn by Messrs. Clayton & Bell. All the mosaic work was executed in Venice, and is fixed by Venetian artists, who came hither for the purpose. The roof, as most of our readers know, is groined, and the spaces between the groins are filled with enamel-mosaic pictures, on gold-enamel ground. Each long panel has a half-length figure of an angel whose head is surrounded by a gold nimbus, and, as well beneath as above every figure, there are ornaments representing foliage, clouds, &c.: the other panels along the centre of the ceiling contain the Prince Consort's crests, with the motto *Treu und fest*, his initial, medallions, devices, and other ornaments.

The roof is divided into two parts: the first we may call the *secular* or *heraldic* part, and the second (east end of the chapel) the *sacred*. In the whole there are 92 angels, each holding a shield. The 64 angels of the first portion are holding shields bearing the arms of the Prince Consort and his family, and the other 28 angels of the second part hold shields with the various emblems of Our Lord's Passion.

The large number of tints, and the improved quality as well of the coloured as of the gold enamels, are very noticeable, particularly the different tints which the gold enamel is capable of receiving, and the successful use of it (ruby-orange and variously-shaded colours) in the wings of the angels, in the *gloria* round the heads, in the shields, crests, and many other important places. The execution of the whole work will occupy, it is stated, no more than *ten* months, dating from the date of receiving the first part of the cartoons (July 1863), till the complete fixing on the roof.

Considering the extent of the work, upwards of 2,000 square feet, as we have already said, this speed is very remarkable, and speaks strongly for the organisation of Signor Salviati's establishment. We shall make a personal inspection before long, and speak more decisively as to the effect of the work.

THE DUCHESS OF KENT'S MAUSOLEUM.

ON the 16th, being the anniversary of the death of the Duchess of Kent, the Queen and Royal family repaired to the mausoleum of the Duchess at Frogmore, where the statue of her Royal Highness (a cast, shortly to be replaced in marble) was uncovered. The statue, which is by Mr. Theed, and was modelled under the superintendence of the Prince Consort, represents the Duchess standing. It is on a pedestal of imperial red Portuguese marble, and is placed in a temple over the chamber containing the sarcophagus.

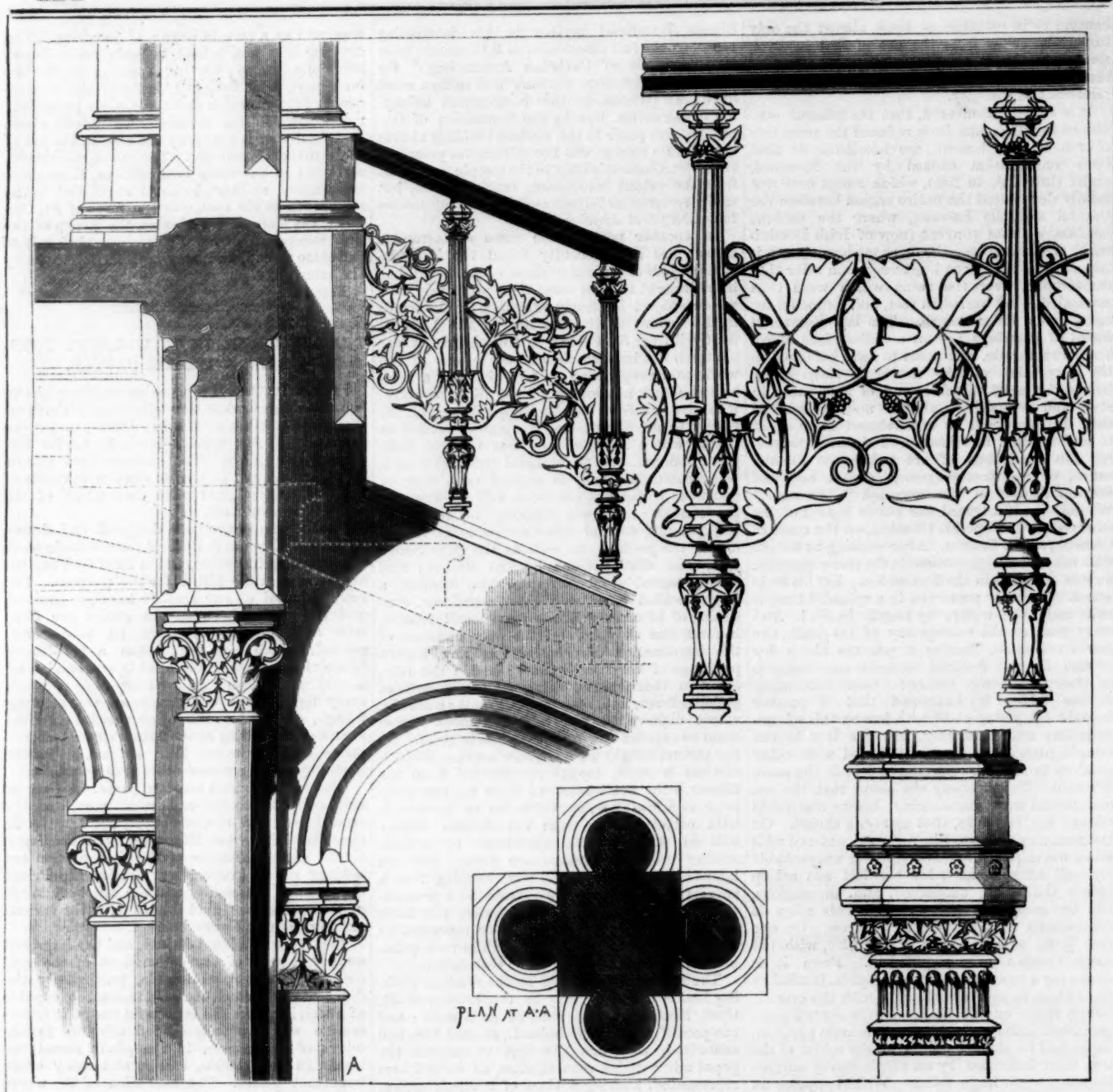
Over the statue is the following inscription:—

"Her children arise up and call her blessed."

The following lines, by Mr. Tennyson, are also inscribed:—

"Long as the heart beats life within her breast,
Thy child will bless thee, guardian, mother mild;
And far away thy memory will be blest
By children of the children of thy child."

A view and descriptive particulars of the mausoleum will be found in our nineteenth volume (1861), p. 531.



THE BANK AND EXCHANGE, VIENNA.——*Details of Staircase.*

SHAKSPEARE MEMORIALS.

The London Committee have at length advertised their first list of subscriptions (about 1,700*l.*), with intimation where donations may be paid. They have lost five good weeks, as it seems to us. Let us hope, however, that all interested in the movement or for the adornment of the metropolis will at once send their names,—those who are willing only to give shillings as well as those who will give pounds. ——A meeting has been held in Holborn to receive a deputation from the London Committee and appoint a local committee in the joint parishes of St. Andrew and St. George the Martyr. The deputation consisted of the following gentlemen: Messrs. W. K. Sawyer, G. Linnæus Banks, C. H. Elt, and J. C. Jeafferson. Appropriate addresses were delivered by the chairman and the members of the deputation, after which a number of names were read as forming the nucleus of a local committee. —— At Stratford, the site of the present market house has been determined on as the best for the statue.——The Manchester subscription now amounts to 1,600*l.*——Extensive preparations are being made at Bury, in Lancashire, by amateur dramatic performances in the Athenæum, on the 22nd and 23rd April, under the patronage of Lord Stanley and the local gentry. The pieces to be performed on both evenings are "As you like it," and "Taming the Shrew." The whole of the scenery has been painted by local artists, and the costumes are to be supplied by a London costumier. The proceeds are intended to be devoted to the erection of some simple memorial of the event. Several architects are actively engaged in forwarding the necessary arrangements; one of whom, Mr. Lawrence Booth, is the honorary secretary.——At Frankfort-on-the-Maine considerable interest is being manifested. It is understood there are to be a banquet, some orations in English and German, and a play in the evening at the theatre—Shakspeare's "Winter's Tale"—which will probably be in English.

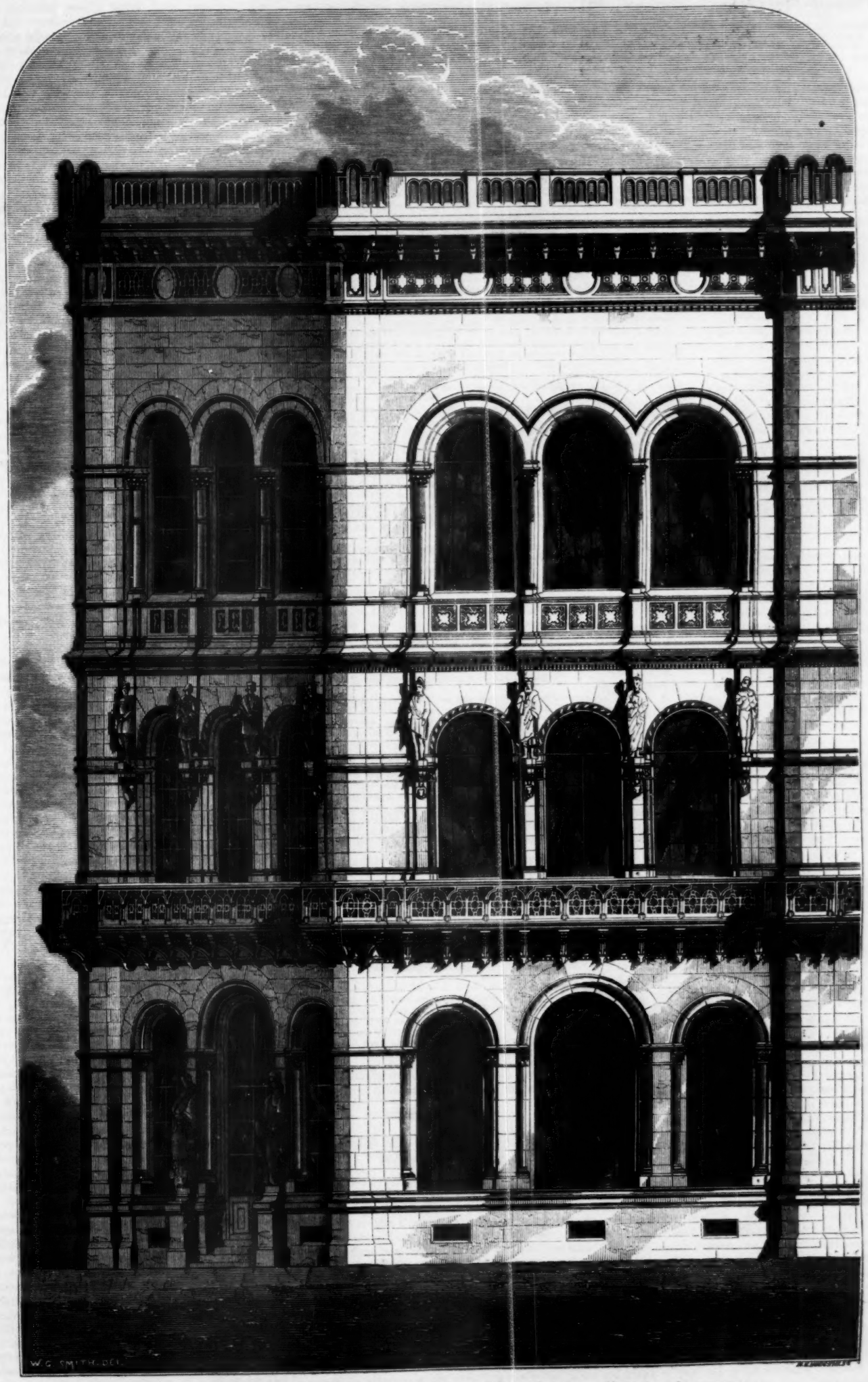
THE BANK AND EXCHANGE, VIENNA.

Prominent amongst the modern buildings of Vienna, some of which were described in our recent series of papers titled "Going Along," is the large building erected for the purposes of the Bank and the Exchange. In a former volume will be found a view of one frontage of the building, with descriptive particulars.* We now add a view of part of the flank, and some details of the staircase, stone and metal. The building was commenced in 1856, from the designs of Herr Ferstel (also the architect, it will be remembered, of the Votive Church in the same city), and was finished, with the exception of the interior coloured decorations, in 1859. The fronts are wholly of stone. With a general agreement between the two fronts, considerable variety will be found on comparison in the details.

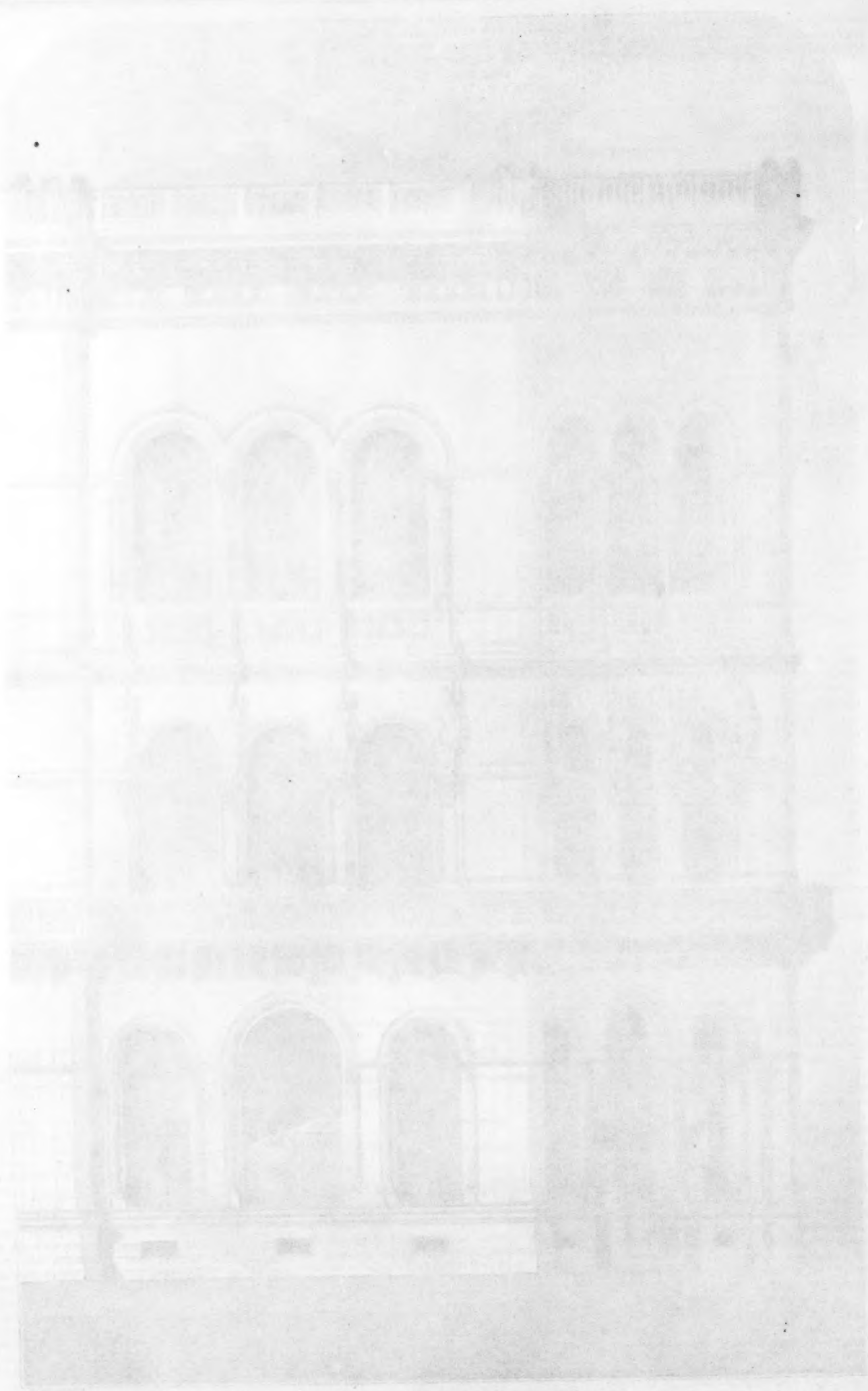
* Vol. xviii. p. 464.

THE RAG COLLECTING BRIGADE.

The waste which is made in a population of nearly three millions of people would, if properly attended to, prove an enormous source of profit. Look, for one instance, to the great loss which at the present time results from the waste of materials used for making paper, a matter of much consequence, for we are now obliged to buy enormous quantities of rags for paper making from abroad. For the purpose of preventing this, the Rag-collecting Brigade, in connexion with the London Ragged Schools, has been formed at Albion-place, London-wall, where at the present time there are more than thirty boys and youths, who, with the trucks to which we have before referred, collect a considerable quantity of rags. The advantage is great to poor boys, and produces also a national saving. For instance, although this Rag-collecting Brigade has been established but a very short time, there have been paid up to last Christmas 424*l.* in wages to boys who, but for this institution, would have been dangerous vagabonds upon the London streets. Besides, they have collected, by four trucks only, in nine months, 49,818 bottles; of paper, 38 tons 19 cwt. 1 qr. 15 lb.; rags, mixed, 9 tons 18 cwt. 2 qr. 22 lb. There are also various rags and bones, carpet, cloth, fat, &c., metals, and rope, altogether making a weight of goods collected by these lads of 82 tons 3 qrs. 27 lb. Besides this, there have been about 70*l.* worth of stuff purchased which was not bought by weight; and the committee have good reason for believing that more than one-half of



THE VIENNA BANK AND EXCHANGE.—HERR HEINRICH FERSTEL, ARCHITECT.



this material would never have found its way into the market but for the facilities which the brigade affords. The materials collected are of the most varied description; — cocked hats, hearse-trappings, old aquariums; in one bag a million of postage-stamps; and in a lot of rubbish was found a Bank of England cheque-book, which was at once forwarded to the Bank: in another were found half-a-dozen pairs of new stockings, which were duly returned to the owner.

The committee express a belief that much of the present waste is caused by the objection which many persons have to deal with the marine-store keepers. Even some servants do not like to go into these persons' shops, which, for the chief part, are places for the encouragement of dishonesty; but in connexion with this brigade there can be no objection. A fair tariff is made, and the collection of waste paper, grease, bones, broken glass, rope, carpets, &c., is, besides the money value, the means of saving lads from destitution, and putting them in the way of earning a proper livelihood.

The boys who form the brigade have been selected from the Shoeblack Brigades and Ragged Schools. At first, a great difficulty was felt in finding a suitable and central depôt; but this was at length obtained in Albion-place, London-wall, at a rent of 77*l.* per annum. It has been fitted up at considerable cost, and an excellent manager has been appointed, who well understands the business, and was himself reared in a ragged school. There are other expenses which now press; but such is the promise, that before long it is believed this institution will be carried on at a considerable profit.

The plan of operation is, that to each truck is assigned a district, the bounds of which are not to be passed except in especial cases. Before commencing perambulation, bills announcing the aims and objects of the brigade are distributed from house to house. The boys assemble at seven in the morning, family prayers are conducted by the superintendent, and breakfast is provided. Then the trucks, each attended by a collector and two assistants, start on their rounds. To be a collector, a boy must be a fair reader and writer, his wages varying from 7s. 6d. to 10s. 6d. a week; but he cannot be appointed to this post till he has 20s. in the Shoe Brigade Bank, as a guarantee for his honesty. The assistants who act under his control get from 6s. to 7s. a week. If the rounds lie near the depôt, they make two or even three loads in the day; but in some instances it is four or five o'clock before they reach home with the first load. The collector is furnished with a tariff of prices: he leaves a receipt for all goods purchased, and obtains a signature on the counterpart for cash paid to the vendor, so that nothing may be surreptitiously bought or sold. At first the boys met with many repulses; but as the system becomes better known the difficulty decreases. The districts most worked have been Islington, Barnsbury, Canonbury, Highbury, Kingsland, Brompton, Camberwell, and Walworth.

The great majority of the boys employed are of a class who would find much difficulty in obtaining employment elsewhere. The first boy engaged was the youngest of three brothers, two of whom had been transported, and he seemed in a fair way of following in their footsteps; but here he was received when every other kind of employment seemed closed to him, and he conducted himself so well, that he attracted the notice of a gentleman, who took him into his warehouse, where he bids fair to do well.

The number of boys employed up to last Christmas was twenty-two; but there can be no doubt that more than ten times this number might be usefully engaged. The wages paid during nine months were 424*l.* The average expended daily by each truck was 13s. 9d., and the number of separate transactions was 9,000.

At the present time there are seven trucks and thirty-four boys at work; and experience shows that each truck requires a floating capital of 50*l.* The weekly purchases per truck now average 5*l.*; and it is some eight or ten weeks before the stuff is sorted, sold, and paid for. Notwithstanding, the trade balance-sheet shows a profit of 240*l.*, which is more than swallowed up in the sums paid in rent, manager's salary, and wages of experienced sorters to instruct the boys, &c., none of which would have to be increased if there were ten or fifteen trucks instead of the present number; and between 200*l.* and 300*l.* are required to place this depôt on a permanent and self-sustaining footing. We trust that this aid will be forthcoming, and that thrifty housewives will keep their rags for the brigade.

ARCHITECTS' BENEVOLENT SOCIETY.

THIS society is quietly doing good work so far as its means permit. We would advocate its claims on the profession, and we cannot do this better than by printing, *in extenso*, the report, the adoption of which at the general meeting on the 9th inst. was moved by the president, Professor Smirke, R.A., and seconded by Mr. Chas. Fowler:—

"The period has again arrived when it becomes the duty of the council to report progress to the general body of members, and to submit a statement of the financial condition of the society.

The council apply themselves to the annual task with mingled feelings of pleasure and pain.

It will be seen by the statement about to be laid before the meeting, that the amount of subscriptions received during the past year exceeds that of the preceding year, and the arrears due are very considerably less. The demands, however, on the charity, have been heavy. Fourteen cases have been relieved, and the sum of 258*l.* has been distributed;—a much larger sum than the council has ever yet found it necessary to so appropriate during any one year.

On the other hand, it must be stated that the number of members has diminished by four. Considering the rapid increase in the number of those who pursue our profession, it seems a sad reproach that such should be the case, and that this society, founded on the purest motives, and whose funds are administered with the most scrupulous and unremitting care, should be left with such restricted means. During the past year we have sustained the loss of three distinguished members.

It is with deepest regret that we have to record the death of one of our earliest, warmest, and most liberal supporters, Mr. Cockerell. In his death the profession has lost one of its greatest ornaments, and this society one of its most valued friends.

It is with grateful feelings that the early members recal to mind the earnest and hearty personal interest he took in the foundation and establishment of the society, and the constant friendliness that he felt and repeatedly expressed towards it during its whole course.

In the deaths of Mr. Bunning and of Mr. Scoles, the society has also lost two among its much-honoured members.

It is with societies as with individuals: we can feel the loss of our earliest friends with the keenest regrets, for they leave a void behind them which cannot be fully replaced.

Among the cases relieved during the past year, several have occurred of great interest. One who was a Gold Medal student of the Royal Academy, and has since lived an active life under favourable auspices, yet now, when upwards of eighty years of age, is wholly without means of subsistence. Another most deserving case is that of a gentleman more than seventy years old, who, without stain on his character, is penniless. Widows equally destitute, yet with large families, are also on our list of recipients.

The perpetual recurrence of new cases such as these, and, indeed, their apparent increase in number, invite our most serious consideration.

It may be assumed, probably, that the profession never held so important a position in the country as it holds at the present time. Owing to the general prosperity of the people, new buildings are rising in every corner of the kingdom, and few are now erected without the aid of the architect. This was not formerly the case. Æsthetic considerations used rarely to enter into men's minds, unless when some great public work was about to be undertaken; and the result of this general consideration for art is very apparent in the poor and insipid character of architecture at the close of the last century in this country.

Those times are passed away. The general public have learnt what sort of a client the man usually has who is his own architect, and hence the horizon of our art brightens.

But let us not be too jubilant. Let us not, in the midst of comparative prosperity, forget the duties prosperity brings with it, nor shut our eyes to the sad sights of distress that lie ill-concealed beneath the surface of professional life. How many of our brethren are pining in want and sickness whilst we are in ease and comfort!

We should, indeed, regard it not as a mere duty, but as a privilege, to help to soothe the sorrows of these unfortunate persons.

Remember that we have it from the most unerring source that, 'without charity we are nothing worth.' Were this truth more practically felt by our profession, especially by those who are practising in the great provincial centres of the country, we should no longer have, from year to year, to urge on them so earnestly as we do the claims of this most excellent institution."

We cordially endorse this appeal, and hope to hear soon of a large influx of new subscribers.

FEMALE ART STUDENTS AND THE ROYAL ACADEMY.

TWENTY-THREE female students at the South Kensington and other art schools, all proposing to become professional artists, have addressed a memorial to the Royal Academy, complaining of the Resolution that was come to last year, that no more female students should be admitted into the schools of the Academy, and praying that liberty may be restored to female students to compete for admission into the schools of the Royal Academy, upon the same terms and conditions, in all respects, as are granted to, or imposed upon, male students.

The memorialists urge,—

"That the limited accommodation need not be made a ground for adhering to the excluding resolution (*if* it be otherwise an undesirable one). First, because the number of female students likely to become competitors will (at least for many years to come) be very small indeed in comparison with the number of male students, while the proportion of successful female competitors is, your memorialists fear, likely to be still smaller.

And secondly, because that inasmuch as your memorialists neither ask nor desire that any preference or favour be extended towards the female competitors at the entrance examination, the result will be that the entire number of students will not be increased."

They appeal to the fact that in many exceptional instances female sculptors and painters have attained to a high degree of excellence; and submit that it is sufficient for the present application to show that such success is possible, however rare; because by how much it is unusual, by so much greater need is there that female students should be deprived of none of the advantages which the more favoured sex possesses.

HOW BENEVOLENCE OPERATES AT MELBOURNE.

THE way in which charitable persons are sought out, and give aid to worthy objects, in Australia, is peculiarly characteristic. "The funds of the Albury Hospital being almost expended," says an advertisement in the *Border Post*, "and the closing of the hospital being imminent, it has been decided to hold a sale by auction, in aid of the funds; and it is earnestly requested that the burden of supporting this valuable institution may be shared by the residents in the district, as well as by the townspeople, on whom hitherto the hospital has mainly depended. Contributions of horses, horned cattle, sheep, pigs, poultry, or any live stock, furniture, ornaments, plants, books, farming or gardening implements,—in short, of everything new or old, are earnestly requested, and will be thankfully received:" Mrs. Walker Jones and other earnest workers, undertaking that task.

Then follows a "fifth list of contributions," among which are—Mr. Metcalfe, an opera-glass; Mrs. Richardson, two pairs of gold ear-rings and pincushion, pleasant sacrifice on the altar of charity; Mrs. Peard, gold ring and fancy work; Mr. Peard, brace of silver-mounted pistols; Mr. S. A. Meyer, a bench-screw; Mrs. Kelly, three pairs of fowls; Mrs. Burleton, 1*l.* 5s.; Mr. T. Keighran, a fat bullock; a Friend (by Mr. Day), a foot-bath, child's frock, three books, and 5s.; Mrs. J. Darby, eight geese, two turkeys, and a magic-lantern; Mr. J. Darby, 1*l.*; a Friend (by Mrs. Blackmore), a pillow, paper-knife, and Moore's Poetical Works; Mr. Bligh, a bag of oats; Mrs. Ogle, children's frocks, plants, and fowls; Mr. J. Nichols, handsome meerschaum pipe; Mrs. French, a fancy mat (2nd con.); Sebastian Schuback, a bag of wheat; a Friend, two pairs of satin boots, three pairs of coloured mittens, twelve yards of lace, knitting cotton, embroidery, cotton, and two pieces of stamped muslin (2nd con.); Mrs. Morgan, a spirit lamp and bread-plate; and so the list goes on. The contributions are, of course, afterwards sold.

THE HOTEL MOVEMENT.

A "LIVERPOOL Adelphi Hotel Company (Limited)" is being formed, with a capital of 100,000*l.*, in 10,000 shares of 10*l.* each. The object of this company is to purchase the Adelphi Hotel, at Liverpool, which is offered for sale in consequence of the death of Mr. Radley, the late proprietor. Its size, however, says the prospectus, is quite inadequate to the constantly increasing requirements of the public resorting to Liverpool, and it is an object of the present company to make such alterations and additions as will supply what is thus needed.——Another Liverpool hotel company is projected, under the title of "The London and Liverpool Hotel Company (Limited)." 120,000*l.* is the amount of its capital, in 6,000 shares of 20*l.* each. The company are said to have arranged to purchase the lease of the Washington Hotel, but they do not propose to enter into any building operations.—As we have before said, it is (or rather was) to be hoped that new and more reasonable charges were contemplated by these new companies than the rapacious tariffs already in force; but now we have ceased to hope for anything of the kind, as not even promises of any such reform are held out in course of this movement. We regret to find that it has assumed so unhealthy a shape; and it requires little foresight to perceive that the only pockets which are likely to be filled by it are those of the old hotel-keepers, who are getting rid of their exorbitant and hence poorly-paying concerns to new companies, in getting up which they are themselves probably chief hands.

MODES OF SEPULTURE FROM EARLY TIMES.

A LECTURE on "Sepulture and Monuments from the Earliest Times" was recently delivered by the Rev. A. Dalton at the Chelmsford and Essex Museum. The lecturer, after alluding apologetically to the largeness of his subject, proceeded to state that there had been four chief or different modes of disposing of the dead:—1st, by burial; 2nd, by burning; 3rd, by exposure to the atmosphere and the ravages of the birds of the air; and, 4th, by launching the bodies on the water to be the food of fishes, as by the Hindoos; but he proposed to confine himself to the two first. The oldest records on this subject came from the Egyptians and the Jews; and, taking the Jew first, he proceeded to show that there was a sort of embalming with spices and gums, which were spread on a linen cloth; and the corpse, being dressed in a best suit, was swathed in this, something after the manner of the Egyptian,—the Jews not being buried in coffins, or if they were, they were open ones. In some cases the bodies were burnt, as in the cases of Saul and his son. The tombs were mostly hewn out of the rock. Generally, the Jews did very little in the nature of monuments to their friends, though they raised small pillars, as over Rachel's tomb; but very seldom were any inscriptions found on their tombs for many ages. He then came to the Egyptians, and described the process of embalming or mummifying. Common mummies were merely soaked in a solution of salt: others were embalmed in a more or less costly and artistic manner: the linen in which they were rolled sometimes amounted to 1,000 yards; and it was curious that upon these mummies had been found every form of bandage known to modern surgery. He then proceeded to explain and illustrate the funeral ceremonies of the Egyptians, and gave descriptions of the Pyramid of Cheops, and the tombs of the kings at Thebes. Passing on to the Greeks and Romans, he said, the former, when a person died, washed and perfumed the body, dressed it in a white robe, with a chaplet of flowers and evergreens, and then laid it on a couch outside the door,—the type of our modern lying in state; and it was then conveyed to the tomb, accompanied, as among the Jews, by hired howlers.

The Greeks buried, as well as burnt their dead; in the latter case preserving the ashes in cinerary urns. The poor were more often buried, as burning was an expensive process,—not in the earth, but on it, the body being laid down at full length, and the earth or tomb raised over it. With the early Romans the preparation of the body was similar to that of the Greeks; but the lying in state was not exactly the same. He then passed to the burials of the early Christians in the catacombs of Rome, in which the implement of martyrdom was often found sculptured on the tomb; and, coming to our own country, a description was given of the British funeral modes and monuments. He called attention to Bartlow Hills as specimens of the tumuli raised by the Romans over their dead. In the neighbourhood of them, as well as in other places in Essex, there had been discovered the graves of Roman children. Anglo-Saxon usages were next explained, followed by those of the Normans, and the gradual development of the altar tombs of the succeeding period; the lecturer concluding with descriptions of those of Queen Eleanor and the Black Prince.

STRIKES.

THE navvies at Sunderland, employed in the construction of the tunnel on the new line, from Pallion to the Lambton Drops, have left work, because the contractor would not accede to their demand for shorter hours. Since an accident took place at the tunnel, the men have only worked eight hours a-day, for which they received 4s.; but now that the tunnel has been rendered safe by timber-work, the contractor wished the men to work (as they had previously done) from six o'clock in the morning until half-past five in the evening for the same wage. To this the men demurred, and they were therefore paid what wages were due to them, and left the place.——The engine-builders employed by Messrs. Marshall Brothers, of South Shields, are on strike till their employers follow the example of Mr. Rennoldson, who acceded to his men's application for an advance of wages. There are nearly one hundred men on strike. At North Shields none of the engine-builders are on strike at present.——The joiners at Cockermouth have given notice of their intention to cease working unless their masters advance their wages from 20s., the present rate of payment, to 22s. per week; and also allow them to leave off work at four o'clock on the Saturday afternoon.——A Birmingham paper says, that various and serious differences have arisen between the builders of that town and the workmen in their employ; that propositions and counter propositions have been made concerning the matters in dispute; and that as neither of the parties seem inclined to give way, it is greatly to be feared that this disagreement will terminate in a general strike, commencing on the 1st day of May. Let us hope not.

NEW CARLISLE-BRIDGE COMPETITION, DUBLIN.

AFTER a discreditable delay, the Selection Committee have given the first three places to the undermentioned designs, and in the order given, viz.;—1. Messrs. Page & Turner; 2. Lanyon, Lynn, & Lanyon; 3. May & Pole.

They add in their report,—

"We deem it right, at the same time, to draw attention to design No. 11 (in stone), motto, 'In Memoriam,' and to observe that, while it occupies a high place in our estimation as a work of great beauty and artistic merit, we have felt it incumbent on us to exclude it from competition in consequence of the greater part of the conditions set forth in the instructions to competitors not having been complied with."

The report is signed, Richard Griffith, J. G. M'Kerlie, and Samuel Downing.

VALUE OF LAND IN THE CITY OF LONDON.

A PROSPECTUS recently published gives the following statement of prices realised by properties in London sold within the last seven weeks:—

The auction mart (freehold), containing an area of about 5,800 square feet, sold for 115,250*l.*; which gives an average of 20*l.* per foot.

The leasehold premises No. 80, Lombard-street, occupied by the Colonial Insurance Company, containing only 1,080 feet, sold to a well-known banker for 30,000*l.*, subject to a ground-rent of 500*l.* per annum for sixty-one years; which, allowing for purchase of freehold, and deducting value of new building thereon, gives 37*l.* per square foot.

The leasehold premises in Finch-lane, lately occupied by the London and Middlesex Bank, containing only 680 feet, realised 10,100*l.*, and this subject to a ground-rent of 500*l.* per annum; which, allowing for purchase of freehold, and deducting value of new building, gives about 30*l.* per square foot.

LONDON VEHICLES.

THE changes in the manner and appearance of the carriage traffic of the metropolis, during the last quarter of a century, is very marked; and amongst these changes the most important, perhaps, were the introduction of the Hansom cab; the swift-running Pickford's vans; the heavy covered waggons which convey merchandise, &c., from the docks to the City warehouses; the Parcels Delivery Company's carts; and more recently the improved and enlarged style of omnibuses drawn by three horses. Mr. Shillibeer, who started the first omnibus in the metropolis, has a painting of this public carriage: it has three horses, and is large, and very much of the same appearance as those which have been only recently introduced, except that there is no accommodation for passengers in front. At present there seems to be a retrogression to close boxes of the very narrowest calibre. The other day we saw several of the steam fire-engines turning out, and rattling along the streets; a striking picture, with their steam and smoke, brightly polished steel work, firemen, and horses. The last and most important of these changes is being accomplished by the advance of railways into the heart of the population and the busiest neighbourhoods. Now the locomotive has made its way to Pimlico and Charing-cross, and soon its noise and whistle will be mingled with the notes of the bells of St. Paul's.

AN AMATEUR ON MODERN BUILDINGS.

SIR,—The true principles of architecture should be the same everywhere. The fundamental principles, at which not even the little-minded critics of the present day can cavil, are truth, appropriateness, and beauty. Truth leads the way: appropriateness is certain to follow; and together they will form true beauty,—the beauty which the Greeks conferred on their buildings and which the Edwardian architects conferred equally on theirs.

If we wish truth to show itself in the piles of buildings we are now everywhere erecting, we must at once abandon stucco. Stucco, rusticated in imitation of stone, is a trick fit, if fit at all, only for gin palaces. May I ask your readers if any of them have seen the *improvements* (ill-treated word!) in Bloomsbury, about Russell-square. I have the misfortune of residing in that locality, and have seen them progress. I have seen pieces of wood stuck in the bricks, and projecting, covered with plaster, and made into a cornice. Then there are massive keystones in square-headed windows, the keystones being constructed on the same principle, or rather on the same unprincipled plan as the cornice. Then the whole is surmounted by a balustrade, which sets off the dirty chimney-pots, of all shapes and sizes, which appear in the background. But I am happy to say that, in the city of London, I see buildings which restore my peace of mind. Take, for example, the warehouses erected for Messrs. Moses & Davis, in Cheapside. This, with the exception of the ground-floor and cornice, is of brick; not a brick building *à la* Baker-street, but one of the most richly ornamented buildings in the city. Take another example, a much plainer building this time,—Messrs. Prew's establishment in Holborn: this immediately strikes the eye as being a satisfactory building, though its ornament is very slight.

A great element of truth in architecture is, in my opinion, the distinct division of the different stories, giving to each its proper adornment, and not carrying columns or pilasters up the whole front of the building. I consider the various façades of St. Paul's Cathedral far more beautiful than those of St. Peter's, at Rome; and for this reason, that in the former each of the two stories has its own separate order, while in the latter one gigantic order is placed over the two stories.

If we consider various buildings in London, we shall see which are the most pleasing to the eye. Take the Goldsmiths' Hall, for instance, a ponderous building; its ornament, so freely bestowed, being inadequate to the task of giving it an appearance of lightness. This ponderousness is produced entirely by the columns round it, which extend up the entire building. Similar to this is the Gresham College, at the corner of Basinghall-street, which is treated in precisely the same way. The Mansion House is another building of the same class; and the Royal Exchange would have been much more handsome if the order had been omitted in its flanks, and confined entirely to the principal front. I do not see any objection to a portico *in antis* covering more than one story. The portico is something more than a mere ornament: it is too large, and too prominent a feature for that: its ostensible purpose is for protection from the weather, and has therefore nothing to do with the stories and windows of the building to which it is attached. It is not my object here to discuss its use, abuse, or disuse; but if its use be not very great, I may venture to suggest that the sooner it is done away with in London the better; for not one portico in twenty is made as beautiful as the importance and size of the feature demands.

The London and Westminster Bank is a happy example of a regular entablature, with architrave, frieze, and cornice placed over two stories of windows, without the other parts of the order to support it. The space between the windows is occupied by rusticated piers. Now, if these piers extended from the basement to the entablature uninterrupted in any way, they would become equivalent to pilasters, and the whole façade would be as faulty in this respect as any of those mentioned above; and if they were to be divided into two stories, the lower one would cease to be a part of the whole, supporting the entablature, which would entirely depend upon the upper story, and become in consequence disproportionately large. But both these extremes are avoided by taking a middle course. The taste and skill of the talented architect caused him to introduce a string-course,

without ornament, which runs along the whole façade between the two stories, and which passes through the piers,—dividing them, it is true, but not sufficiently so to disconnect the upper and lower portions. They are divided into two stories, but still remain one whole, and that forms a beautiful façade.

One of the latest new erections in the City is that in Threadneedle-street, for various companies, of which you gave a view in your last number. It contrasts favourably with its neighbour the Telegraph Office, which, besides being daubed over with stucco, has no bold horizontal lines to mark the different stories. Opposite these buildings, in Cornhill, is one of great beauty, belonging to the Universal Marine Insurance Company, which serves to illustrate the principle I am advocating. Many others might be instanced; some almost entirely without ornament, yet beautiful, simply because this great element of truth (which is beauty in itself) is observed.

It may be noted that Sir Christopher Wren usually preferred to put two rows of windows in his churches—the lower and smaller to light the space under the galleries—to having one row, which would be cut in two by a hideous gallery.

In conclusion I must draw attention to a warehouse in Newgate-street, nearly opposite the hall of Christ's Hospital, in which the horizontal and perpendicular lines are both very bold, giving the building a very peculiar appearance, by cutting it into oblongs and squares of various dimensions. This should certainly be avoided; for, though checks do very well for tablecloths and trowsers, they do not suit the fronts of buildings, even though the buildings themselves are for the sale of such goods.

EX STIRPE.

MURMURS FROM THE SEA-SIDE.

IN last Saturday's *Builder*, in the article headed "Variorum," is a notice of a little book on Smoky Chimneys. *A propos* of them, will you allow me to describe to you some chimney-pots which I saw at St. Leonard's, and which were designed to prevent the smoke returning down the chimney in windy weather? Around the pot at equal distances, four conical tubes are placed wide mouth downwards, with openings at the top into the large central tube, so that the smoke, if beaten back by the wind into the pot, may escape by these tubes instead of returning into the room. I am unable to speak from experience of the efficacy or otherwise of this arrangement, but the superintendent of the works where they are made (in Hastings) assured me that he had never known one to fail, and that they are especially effective when placed upon the short chimney-shafts of attic chambers.

In addition to their alleged merit of curing smoky chimneys, they possess the great recommendation of being pleasing to the eye. Generally speaking, a red clay chimney-pot is a most unsightly feature to a house, but these are really picturesque, especially when seen against the deep blue sky that usually smiles above a seaside or country town. For stone or stuccoed houses the pots are baked white; but the form is not so appropriate for that as for the Elizabethan red. Great variety of outline can also be obtained by arranging the chimneys in stacks of 3, 4, and 6; and again, by placing the pots diagonally on alternate stacks, and square on the intermediate ones.

The manner in which house building is progressing in and around Hastings and St. Leonard's is something marvellous. Rows of good houses are springing up in all directions, with plenty of small ones too; and for miles out the downs and fields are studded with buildings in all stages of construction. The inhabitants attribute part of this bustle and excitement to the Princess's recent visit; and one line of houses, facing the sea, and very near to "Bo-peep" station, whither St. Leonard's now extends, attests the fact by bearing for its name "Sandringham Place."

While writing about St. Leonard's, the *Builder* being a general reformer, I will touch upon a subject wherein there is scope for amendment, there as elsewhere—the enormously long morning service to which, in some churches, congregations are condemned to listen.

Last Sunday I went to St. Mary Magdalen's, having learned that the Bishop of Carlisle was to preach in behalf of the "House for Invalid Gentlewomen." Not because I run after Bishops as such, but the church named chanced to stand conveniently, and, better inducement still, I much approve of the worthy charity for which he was to plead. Bearing in mind the unusual length of the preceding portion of the service—second lesson having been seventy-five, and the Gospel fifty-four verses long—one would have thought the Bishop would have endeavoured to make his sermon particularly short and pithy. Instead of this he rambled on (I must say it), in a feeble voice and uncertain manner, until all one's charitable enthusiasm was entirely extinguished; and not until one o'clock, when we ought all to have been on our way home again, did he touch upon the charity for which he stood there to bespeak our aid. After the sermon was ended, the collection was made from pew to pew: a lengthy process, that necessitated the slow and measured reading of the whole of the offertory sentences, and then we had to listen to—*praying* it was out of the question, fatigued as we were by that time—the prayer for the church militant. Not until a quarter past one o'clock were we allowed to escape again into the fresh air.

People really do not go down to the sea-side to be shut up in a narrow pew of a small and crowded church to listen for two hours and a quarter to "vain repetitions." Oh! that we could have, somehow or other, a little more of the soul and a little less of the body of religion bestowed upon us by our clergy!

A SEASIDE LOUNGER, BUT NOT AN IDLE ONE.

ZINC ROOFS.

A CORRESPONDENT some time since asked for information as to the right way to lay zinc. I shall be happy to give him the information, for there is more importance in the mode of laying and the arrangement of woodwork than is yet generally known. Many roofs are spoiled for want of care in these points.

After getting good falls and drips, I lay every sheet of zinc perfectly free for contraction and expansion, and in such a manner, that in the event of alteration or cuttings in roofs, the sheets, 8 feet by 3 feet, can be taken up and relaid without injury to the metal.

I lay none but Devaux's pure Vieille Montagne zinc, and refuse the work unless the proper thickness is allowed, viz., No. 13 as the minimum, and 14, 15, and 16 as the best gauges I prefer to employ. Good zinc thus laid is quite as lasting as lead, if the woodwork is arranged according to directions given.

I covered the Victoria Station, Pimlico, for Messrs. Devaux, and every sheet now lies perfectly free and unconfined: no wet has got in through the zinc since the roof has been covered. The skylights and iron gutters have let wet in on several occasions, but on examination it was found that the zinc was perfectly sound and watertight.

JAMES W. TYLER.

ECLECTICISM IN ARCHITECTURE.

SIR,—Here is the question of the moment that some of the lecturers of the season, either at South Kensington or the Architectural Exhibition, should grapple with,—"*l'éclecticisme est la plaie de l'art*,"—that memorable motto of Lassus at the competition of Lille. Would that it had struck deeply into the minds of our architects. It is the "sore" we have suffered from for the last ten years, and we are still in full state of disease. Our architects rush to France and Italy, are struck with the grandeur of French and Italian Gothic, and come home and build churches and domestic buildings with as much French character as they can introduce. They entirely forget that Gothic grew up in every land, province, and even county, in accordance with the materials at hand, the wants of the people, continuing the traditions as heretofore practised, expressing the national mind and poetry fully, and being every way in harmony with the surrounding scenery. It seems to me to be monstrous to design a village church with pretension in many details of a French cathedral, and to set that down on the banks of the Thames in Berkshire. The whole thing is out of place. The true little Berkshire church is just the very thing required for the spot. On the score of reason, it appears so unreasonable to introduce foreign effects into England. I want to know who would go and build a Berkshire church in Pisa or Carcassonne. To build a Belgian town-hall in England is absurd, since the very municipal constitution is wholly different; and, moreover, they are used for different purposes, to say nothing of the inappropriateness of style. Moreover, I see in this eclecticism a total want of all love for national tradition and poetry. No man can be thinking of his own poetry and traditions when he is thinking of the grandeur, massive magnificence, and superabundant richness of detail of French Gothic. Our architects say French Gothic is so grand. Yes, I know it; but it is the very quality all out of place in English scenery, and a quality having no tradition in this country. Here our scenery is small, confined; our architecture is homely, without any pretence. There can be no prospect for good architecture so long as our architects are not Englishmen!

It is common in modern work to see all the pretentious grandeur of a cathedral, the superfluity of ornament and detail, given to a parish church. Our modern architects cannot do village work: they do not seem to be able to build a Sussex or Berkshire village church. The love of French grandeur and massiveness has entirely ruined their taste for simplicity. Cardinal Wiseman is to lecture on the future of English architecture: will he grapple with these points?

A. W. T.

SANITARY MATTERS.

Wellingborough.—Any one who has watched the march of improvement in Wellingborough during the last ten or twelve years, remarks a local paper, cannot fail to be struck with the progress the town has made. Perhaps the sanitary improvements are the most numerous, and the best carried out, of any. A glance at these may not be uninteresting, as no one knows how long the drainage of the town was a disgrace and a nuisance. The rising generation know little or nothing of the filthy cesspools, the surface drains, and the manure-heaps which were allowed to exist under the eyes and noses of the inhabitants of Wellingborough of bygone years. The principal parts of the town were very bad in this respect, and the yards, byways, &c., were abominable in many instances. It grew to such an extent, that a reformation was imperative, and the establishment of the local Board of Health, and the laying down of the new sewerage, were the result. There was a good deal of bungling in the undertaking, which elicited (and not unnaturally) a considerable amount of grumbling among the ratepayers, in consequence of the unworkmanlike manner in which the work was done. Penurious landlords growled at the expense, and tenants grumbled at an increase of rent. But the thing has worked well in spite of all obstacles: the town is well drained; and few, we imagine, of either landlords or tenants now regret the alteration, or would like to go back to the undrained past.

Guisbro'.—A meeting of the ratepayers of Guisbro' has been held in the Toll-Booth, for the purpose of considering the desirability of adopting a general system of drainage throughout the town, either upon the plan submitted to the inhabitants by the late Mr. Richard Mason, C.E., or upon some other approved plan. The hall was crowded to suffocation, popular interest in the question having doubtless been much intensified by the awfully rapid rate of mortality which has characterised Guisbro' for some time past, and more especially during the last twelve months. The following resolution was carried by a large majority;—"That it is the opinion of this meeting that the town absolutely requires a system of town drainage; and that steps be taken at once to carry out that most necessary and desirable object." Afterwards the following resolution was carried *nem. con.*;—"That a committee of the following gentlemen (viz. 37 of the representatives of all kinds of property in the town) be formed, and requested to consult some practical engineer, with a view of carrying into effect the plans of the late Mr. Mason, C.E., or some other plan equally effective; and also to obtain estimates and discuss the most advantageous mode of carrying out the drainage of the town, reporting the results of their labours to a future general meeting of the ratepayers."

Llanelly.—Fever and smallpox are prevalent in this place, several persons having recently died from these epidemics.

Sanitary Reform.—The registrar-general has recently brought under the notice of the authorities of the great cities of Europe a plan for securing returns of diseases and of the weather, simultaneous with those of London. Vienna, which is the seat of one of the greatest medical schools of Europe, has already responded to his application: he expects to receive from that city a regular series of returns, which cannot fail to afford interesting comparisons with those of London. Vienna is about to adopt (not before they were needed) many of the sanitary improvements which have proved efficacious in England; and Dr. Glatter, a zealous officer in the city council, will be able to measure their effects on the reigning disease and the rate of mortality.

AYLESBURY.

IN consequence of the proposed erection of a new Corn Exchange on the site of the White Hart Hotel, in the Market-place, as we mentioned recently, the central block of buildings now called the Market-house is to be removed, and the space left open, which must improve the surrounding property, as well as also the health of the inhabitants. A correspondent writes,—"This old building is a copy of the Temple of the Winds, at Athens, but this fact will not save the doomed structure, which is neither useful nor ornamental. The White Hart is one of the oldest inns in the county. In Cromwell's time it was kept by one Gilby, a Parliamentarian, zealous for the cause of the Protector. One night a way-worn traveller sought rest and refreshment; but mine host soon found out the rank of his guest, who proved to be the Earl of Rochester, flying for his life. Gilby informed the earl it was his duty to arrest him, but the earl's promises overcame the innkeeper's scruples: he assisted him to escape, and after the Restoration was substantially rewarded. The casual visitor to Aylesbury fond of old paintings will find some old portraits in the smoking-room of the George Hotel. Among them is one of the celebrated Countess of Pembroke, sister to the Duchess of Cleveland. These portraits, if not original, are very excellent copies, and worthy the attention of the connoisseur."

CHURCH-BUILDING NEWS.

Lowestoft.—The foundation of the new Bethel, which is situate in Commercial-road, was laid on the 26th of October last by Mr. Edward Leathes, and the building was opened for divine worship on the 4th instant. The building was neatly decorated by Miss J. W. Gowing. The cost of the erection, including the land, was about 530*l.* The building is designed in the Early English style of architecture, and consists of a nave and chancel. The nave is lighted by a five-light window in the gable, and double lights in every bay: the chancel window is in three lights. The glass used is the rough cathedral plate cut in quarries, with a tinted margin. The roofs are open, with stained and varnished timbers. A system of ventilation has been adopted by match boarding on the under side of the rafters. Open benches are used, with oak-stained seats and backs, and cast-iron stands of a Gothic pattern. As soon as the walls are thoroughly dry, it is proposed to embellish them with suitable passages of Scripture. An appropriate external feature has been added to the nave gable, in the form of an anchor, with cable complete, carved in relief upon a stone shield, with the words "Sailors' Bethel" thereon. Mr. James Balls, mason, executed the carving. The committee purpose, immediately funds permit, to build a class-room in the rear of the building, for which a space has been left. The edifice was designed by Mr. W. O. Chambers, of Lowestoft, architect, under whose superintendence the church has been erected. The contractors were Messrs. J. Newson, jun., T. Tuck, and C. Scarlett, the fittings being supplied by Mr. J. W. Ling.

Bovinger.—The parish church of Bovinger, near Ongar, has been re-opened after considerable alterations in the chancel, which were carried out under the direction of Mr. Chancellor, of Chelmsford. The work, carried out by Mr. Brown, of Bocking, consists of a new arch of Bath stone, carved oak stall seats, encaustic tiles, and a timber roof, the cost of which has been defrayed by the rector, the Rev. W. M. Oliver.

Buckingham.—The ceiling of the church, with its ornamentation, is found to be in such a decayed state that immediate repair has been found necessary, and the church is now filled with a scaffolding and repairs are going forward.

Birchington.—At a meeting of the church restoration committee, Mr. C. N. Beazley, the architect, attended to submit to the meeting the result of an interview with Messrs. Gascoigne & Godden, of Canterbury, the builders. It was determined that the works should be commenced immediately after Easter, and the contracts were to be signed in a few days. The chancel will be restored, new roofed, and seated, at the expense of the Dean and Chapter of Canterbury. The tower and spire will be repaired, and the bells re-hung, towards which the Trinity Board have contributed a grant of 100*l.* In the nave and aisles the roofs are to be thrown open, repaired, and re-tiled. The floor will be levelled. New open sittings of uniform character will be placed, affording accommodation for 542 (double the number of the present sittings). The cost of this part of the work will be about 1,200*l.*, of which about 700*l.* or 800*l.* have been already got together.

Shipton-on-Stour (*Worcestershire*).—For the erection of buildings at the Cemetery, in accordance with the design of Mr. W. H. Knight, of Cheltenham, the contract tendered by Mr. H. Parker, of Shipston, builder, has been accepted, at the sum of 1,500*l.*, the work to be completed by November next. The buildings, with the exception of the lodge, will be of stone, and consist of two chapels, one for the Church of England, the other for Nonconformists, with a tower and spire, central dome 70 feet in height, and a porter's lodge at the entrance gate. The land purchased for the cemetery is on an eminence, and commands a view of the surrounding district.

Hindlip (*Worcestershire*).—The church here has been restored. Mr. W. J. Hopkins, consulting architect to the Diocesan Church Building Society, furnished the plans and superintended the work; and Mr. Warner, of Malvern Link, was the builder. The chancel has been rebuilt, and lengthened eastward. The east window is a triple-light Early Decorated. Windows of single and double lights are in the south and north walls. The roof is open timber work, with arched principals, and of the same height as the nave roof. A vestry on the north of the chancel opens thereto by a segmental pointed arch, and a similar arch separates the nave from a new transeptal chapel on its south side. A two-light Decorated window has been opened in this chapel, and the windows of the nave are of the same style, single and double lights, the former being old remains and the latter new work. A portion of the walls of the nave is old, and so is the tower. The latter stands at the west end, is of nearly the same width as the nave, and through its base is the principal entrance to the church. The church is warmed with a hot-water apparatus supplied by Messrs. Badger, of Worcester. Externally the roofs and main portion of the walls are new, tiling parti-coloured.

Gloucester.—"It is understood," says the local *Chronicle*, "that an attempt is being made in earnest to carry out a thorough renovation of our beautiful cathedral. We hear that the Lord-Lieutenant had a conference with the dean and resident canon on Tuesday last. As this first meeting was strictly private, we have no means of ascertaining what occurred. It is, however, believed, that an immediate appeal to the county was determined upon, and that the Lord-Lieutenant, the Lord Bishop, the Chancellor of the diocese, and Mr. Holt, the registrar, gave promises of liberal contributions."

Cheltenham.—The friends of the Rev. George Roberts are about to build a new church. It is estimated that 10,000*l.* will be required, and 3,000*l.* have been subscribed towards that sum.

Hyde.—Exertions are now being made for the erection of a church in the parish of St. Thomas, wherein divine service may be performed in a more seemly manner than is possible under existing circumstances. The architect for the new church is Mr. J. Medland Taylor, of Manchester, who has prepared designs for a church to seat about 800 persons. The material is stone, to be obtained from local quarries, for the most part with dressings of Hollington stone.

Gateshead.—The committee of the proposed Church of St. James have resolved to call in the aid of Messrs. Austin & Johnstone, of Newcastle, architects, to prepare plans (in accordance with the instructions of the Incorporated Church Building Society) for a church to accommodate at least 530 persons, and at a cost which should not exceed in all 2,500*l.*

STAINED GLASS.

St. Michael's, London.—Ten cartoons have been ordered for one of the great windows in the new church of St. Michael's, London, from Moritz von Schwind, an artist who prepared some of the glass paintings in Glasgow Cathedral.

Springfield Church (*Essex*).—A painted glass window, representing Faith and Hope, has lately been inserted in this church by Mr. R. W. Peacock, to the memory of his brother, Mr. Mark Beauchamp Peacock, late solicitor to her Majesty's post-office. It was designed by Mr. Holland, of St. John's, Warwick.

St. Matthew's Church, Hastings.—A stained-glass window has just been presented to the church of St. Matthew, Tivoli, by members of the congregation and other friends, in testimony of their esteem for the Rev. John Cumberlege, B.A., who built this church in 1861. The subject is the "Ascension." Messrs. Clayton & Bell, of London, were the artists.

Rodmell Church, Sussex.—Six stained glass windows, executed by Mr. Wailes, of Newcastle, have recently been placed in the little village church of St. Peter's, Rodmill. Five of these have been presented by Mr. B. G. Windus, of Tottenham, Middlesex, the sixth being the gift of the rector, the Rev. P. de Putron. The subjects of two windows, on the south side, are from the parables of "The Good Shepherd" and "The Sower:" the third, near the baptistery, is "The Presentation of our Lord in the Temple." The three larger windows are placed on the north side, each containing two medallions, the subjects of which are taken from the Old and New Testaments, type and anti-type, "The Crucifixion" with "The Sacrifice of Isaac," "The Resurrection" with "Joseph being taken out of the Pit," and "the Ascension of our Lord" with "The Translation of Elijah."

Little Ellingham Church, Norfolk.—A three-light memorial east window has been put up in this church by Mr. F. Preedy. The principal subjects are "The Agony in the Garden," and "The Ascension," with four other Scriptural subjects in the side-lights. The work of restoration at this church has been done under the direction of Messrs. Mallinson & Healey, of Bradford, architects.

Christ Church, North Shields.—The family of the late Mrs. Coppin are placing a window in this church, in remembrance of their mother. Mr. Wailes, of Newcastle, is the artist. The centre piece is illustrative of obedience to parents, and the two other groups are "Feeding the Hungry" and "Clothing the Naked."

PROVINCIAL NEWS.

Brighton.—The widening of the King's-road and Junction-road, from Ship-street to the western entrance to the Chain-pier, is under consideration. The computed cost of this work is nearly 10,000*l.* The King's-road, opposite Market-street, must be widened 40 feet, and farther on in proportion (remarks the local *Herald*, while speaking of it), so as to make one wide sweep of promenade and roadway from one end of the town to the other.

Ipswich.—At a special meeting of the town council, the Town-hall committee report was read, the conclusion of which is as follows:—"Your committee therefore recommend that a new town-hall, museum, and library should be erected upon the site above referred to, namely, that of the present town-hall and adjoining property; that the council should authorise the expenditure of a sum of money, not exceeding 10,000*l.*, for the erection of such town-hall, museum, and library; that a committee be appointed by the council to settle the details of the accommodation required in the proposed new buildings; that advertisements be issued inviting plans for the proposed buildings; and that the committee be authorised to expend a sum not exceeding 200 guineas, in one or more premiums, for securing such plans." After some discussion the report was approved of, and the sub-committee of the Estate and Paving and Lighting Committee were appointed to carry out the report.

Norwich.—The report of the St. Andrew's Hall restoration committee presented to the corporation states, that the subscription fund realised the sum of 1,437*l.* 11*s.* The total outlay connected with the restoration and improvements amounted to 4,489*l.* 6*s.* 6*d.*, and the payments made on account of such expenditure to 2,323*l.* 18*s.* 8*d.*, leaving a balance unpaid of 2,165*l.* 7*s.* 10*d.*, of which in the opinion of the committee 1,741*l.* 6*s.* 5*d.* might be fairly charged upon the tonnage revenues, the balance, 424*l.* 1*s.* 5*d.*, to be provided by the city committee from corporate funds. After some discussion the report was received, and the committee, consisting of the parliamentary, and bye-laws and finance committees, was appointed to consider the best mode of paying the debt, with the power of taking the opinion of counsel, and to report to the council thereon.

Doncaster.—The race committee, by a majority of seven to four, have recommended to the town council certain alterations at the stand and enclosure, which will ultimately involve a sum of at least 1,500*l.*

Books Received.

"How 'Nicely' we are (locally) Governed," with especial reference to Shoreditch, St. Luke's, and Bethnal-green. By ONE WHO KNOWS. (147, Fleet-street.)

THIS pamphlet is coarsely written, and doubtless exaggerates greatly; but it reads, nevertheless, as if there were quite enough truth at the bottom to call for the interference of a more independent class of ratepayers than those who now usually take office. The writer asserts that the head-money, 5s. a day, allowed to members of committees when making "surveys," is an inducement to an improper class. One quotation will serve to show the straightforward character of the writer's charges:—

"The monster evil connected with our present representative system will be found amongst those who take office ostensibly for the public good, but actually to 'work the oracle' for certain contractors. The ramifications of this kind of duty pervade the whole mass to an extent that the uninitiated would hardly dream to be possible. We frequently see the sums tendered by able contractors passed over by some of the highest Boards, simply because they are not (query, confidentially?) known. This, when interpreted, must be taken to mean that the extent of their 'bleeding' capability is untried. Your 'sure' contractor is a great card with the needy scheming people who can talk, are dabsters at 'jobs,' and have abjured all squeamishness. When all other sources of refreshing gain are dried up, or become devastated, it is blandly hinted to the contractor that discount for the patriot's little acceptances would be esteemed, and forth flows the yellow clinking rill, never, probably, to return to its parent source, for somehow it never is 'quite convenient' to the patriot to regard the date on the stamped paper thus adorned with his signature."

VARIORUM.

"Fast in the Ice," "Fighting the Whales," and "Away in the Wilderness," are the titles of three little books forming part of "Ballantyne's Miscellany," published by Nisbet & Co. The object of the Miscellany, according to the preface, is to place within the reach of the working classes, information now only to be found in expensive books, and this object is carried out very well. A little tale is worked up in each volume so as to convey the information in an attractive form. The books will please boys of all classes.——"Curiosities of Savage Life." By Jas. Greenwood (S. O. Beeton, Strand). In two smart volumes (first and second series), Mr. Greenwood has brought together from various sources a large amount of interesting matter concerning savages of all countries. Treated of under the head of subjects, as "Warfare," "Incidents of personal Peril," "Religious Rites," and so on, the various countries are not kept very clear; but be that as it may, it certainly makes amusing reading. Each volume has nine illustrations, printed in colour, besides a considerable number of wood-cuts. ——The illustration-producing-power of the Messrs. Dalziel is immense. Their "Illustrated Series of Standard Works" is but one example, though a great one. This includes "The Vicar of Wakefield," now in progress; and "The Arabian Nights' Entertainments" (Ward & Lock, Fleet-street), both very fully illustrated and very cheap. Touching the first of them, the engraving is certainly better than the designs. The Vicar and his family are old friends of ours, and we do not find their likenesses in any of the illustrations of Part No. 1. The group at the head of Chapter I., in fact, is enough to deter any man, with an instructed eye, from turning over another leaf. It is simply abominable. In the "Arabian Nights'," too, we are forced to confess that very few of the illustrations give us any pleasure, notwithstanding the excellent names on the title-page. The sooner the Messrs. Dalziel have a little serious talk with their artists the better.

Miscellanea.

ARTIFICIAL RAINBOW.—M. J. Duboscq, it appears, has contrived for the French theatre a method of imitating the rainbow, of which *Cosmos* speaks highly. M. Duboscq employs an electric light, obtained with the aid of 100 Bunsen elements. The first lenses of his optical apparatus render the rays from this source parallel, and transmit them through a rainbow-shaped hole in a screen to a double convex lens of very short focus, from which they pass to a prism, and emerge with sufficient divergence to make an effective rainbow on a screen about 6 yards off. This rainbow is said to be brilliant even when the whole scene is lit up.

ACCIDENT.—A building in the course of erection, in George-street, Pontypool, and intended for a warehouse, has tumbled down. A workman received considerable injury.

CHURCH BUILDING ACTS.—In the Commons last week, in reply to Mr. F. Powell, the Attorney-General stated that it was intended to introduce a Bill for consolidating and amending the Church Building Acts and New Parishes Acts shortly after Easter.

NEW PIER FOR ST. IVES.—The works of the new pier will be commenced forthwith. Mr. Robertson has contracted to construct it for 15,500*l*. It will be 600 feet in length, commencing from the Castle Rocks, and is to be completed in August, 1865.

PUBLIC PARKS AND THE VALUE OF SURROUNDING PROPERTY.—In connexion with the recent debate on the Hulme and Chorlton Public Park, in the Manchester City Council, and also with the suggested public park at Warrington, and that forming at Oldham, the following statement is worth notice:—The central park in New York has cost that city nearly 1,500,000*l*., and it has increased the taxable valuation of the surrounding property nearly 5,500,000*l*.

RAILWAY TO CAPE CLEAR.—We are told that Mr. Forsyth, engineer to the Board of Works, has been inspecting Cape Clear, where it is the intention of the Board to erect a pier and breakwaters in the south harbour. The work is estimated at 6,000*l*., of which sum Sir Henry W. Becher has contributed 500*l*. We are informed, on good authority, says the *West Carbery Eagle*, that Mr. Forsyth inspected the adjacent islands with a view to the extension of the West Cork Railway to Cape, *viâ* Baltimore.

VICTORIA TOWER.—In reply to a question in the Commons last week, Mr. Cowper said that the Thames Embankment Commissioners had made a valuable recommendation for the enlargement of the space near the Victoria Tower, and for the extension of Old Palace-yard to the river bank south of the Tower, by which the wharves and buildings in the neighbourhood would be cleared away, and all elements of danger removed. This recommendation, however, involved the expenditure of a large sum of money, and therefore he was unable to say when he should be able to submit a proposal to the House.

ELECTRIC TELEGRAPH COMPANIES.—It may be useful to our readers to know that an Act of Parliament (26 and 27 Vic., c. 112) was passed last session for regulating the construction of electric telegraphs. Under the 22nd section of this Act, where telegraph posts are placed within ten yards of a dwelling-house, or the wires across an approach to a dwelling-house, without the consent in writing of the owner or occupier, it is competent for either owner or occupier to give notice to such company to remove the posts and wires, and unless the posts or wires are removed, or the differences arranged, to send a copy of the notice so given to the Board of Trade, who will make "inquiry and examination," and "hear and determine the matter of objection." The decision of the inspector from the board is to be final, and costs are to be awarded against the company, or not, as he may direct.

BOLTON FISH MARKET.—A new fish-market is about to be erected in the immediate vicinity of Bolton market. The basement and sub-basement of the new edifice will be divided into ice cellars, cellars for cleaning and storing fish, and all the requisite conveniences, and will also have two shops on the side which faces Bridge-street. The ground-floor will be devoted entirely to the purposes of the fish-market: it will measure 113 feet by 34 feet inside, and be divided with light ornamental iron screens into the requisite number of stalls, having a side entrance in Rushton-street, and the principal one in Corporation-street. The sides of the building will be arcaded both internally and externally, the piers and dressings being of stone, and the intermediate spaces of red brick, with the exception of the basement, which will be built entirely of rock-faced stone. The market will be lighted principally from, and ventilated by, the lantern, which extends from end to end of the roof. The roof itself will be framed with wrought-iron elliptical principals, springing from carved and moulded stone consoles, connected with longitudinal beams: over these boarding will be fixed to carry the slates. Mr. J. W. Best, of Bolton, is the architect. The outlay will be between 4,000*l*. and 5,000*l*.

A LIVERPOOL CHAPEL BUILDER.—Mr. George Pennell, of Liverpool, has given to the Primitive Methodist Connexion four chapels and five houses, all of which are situate in Liverpool, and are worth about 5,000*l*.

MAP OF SEAT OF WAR IN JUTLAND.—Mr. Wyld, of Charing Cross, has published a map of the Environs of Fredericia, and the country around the Little Belt, on a good large scale, although the map is small in itself. The references are clear, and the positions of the Austrians are marked.

BRUSSELS.—The Bishop of Oxford is to lay the first stone of the new English church here on Tuesday, the 5th of April. It has been long contemplated, but a site has only lately been obtained after great difficulty and very large expenditure. The church is to be built of the Antwerp bricks, is to accommodate about 700 people, and is to have a lofty tower and spire. The site is in the Rue des Drapiers, leading out of the Avenue de la Toison d'Or. Mr. R. J. Withers is the architect.

THE SHRINE OF ST. MANCHAN.—At the last meeting of the Royal Irish Academy, Sir William Wilde read a paper "On the Shrine of St. Manchan." He exhibited the ancient shrine, which was at the Dublin, London, and Kensington Exhibitions. It exhibited much interest in point of its artistic excellence. He had thought a great deal on the subject of restoring it, and summoned a jury, consisting of Dr. Petrie, Dr. Todd, the president, Mr. West, and Mr. M'Carthy, and he had, to the best of his skill and ability, with their assistance, effected a restoration, which he exhibited amidst applause.

THE "VICTORIA PARK," BELFAST.—The *Newsletter*, commenting on our paragraph as to the proposed park for Hulme and Chorlton-upon-Medlock, Manchester, at a cost of 30,000*l*. says: "From the foregoing, the people of Belfast can form some idea of the large amount of money required to *purchase* a site for a public park in other places; yet here, in this good town of ours, although sixty acres are lying waste, under the ridiculous title of 'The Victoria Park,' nothing is being done to form them into what they were intended to be."

LECTURE AT THE HANDBRIDGE WORKMEN'S READING-ROOM.—We have given a specimen of the sort of musical entertainments given at the workmen's clubs, and may now show what sort of lectures are occasionally given. On this occasion Mr. Davidson, the lecturer, who had previously given several lectures on animated nature, devoted his discourse to man himself. First he sketched and explained the skeleton. Then he showed the position and action of the lungs in respiration. Then followed a rapidly sketched view of the front of the chest and arms, showing the action of the muscular system; also, by means of tapes, he showed how the tendons act on the various joints. Next he proceeded to add, within the previous sketch, the brain and spinal cord, showing the origin and action of the nervous system. The skull came under consideration, and was compared with that of the monkey tribe. This necessarily led to "faces," in connexion with which theme Mr. Davidson sketched the sensible face, the inquisitive face, the peaceful face, the combative face, &c., showing the alteration made in the expression by the modification of any one feature. The lecturer went into the subject of the influence of alcohol on the stomach, liver, blood, and brain. You have seen, he continued, how the excessive use of spirits and strong drinks destroys the coating of the alimentary canal, and injures the digestive powers—mixes with the blood, which, poisoned and infected, rushes on like a stream of fire to the brain,—the brain! the source of thought and action. The man is maddened, is driven to acts of violence, and becomes degraded to the level of the brute. But this is not all! Worse still,—the malady thus brought on ends not with ourselves, but is carried on to our children—those sacred charges, those lovely flowers in the garden of life given to cheer and bless us. Yes, in them does the physical and mental weakness engendered by our own neglect of the laws of health re-appear, and they become stunted either intellectually or bodily. Our wives, whose lives have become a portion of our own, whose every thought and feeling is devoted to us,—do men think of them and of home when they drown their hearts and their brains, and outrage the laws of health? The lecturer at the close was greeted with three hearty cheers, which showed well how his instructive lecture was appreciated.

OXFORD CORN EXCHANGE.—The new exchange has proved so great a success that the directors recommend a dividend of 20 per cent. on the first year; and that for the future the charge for stands, with desks, be reduced from three guineas to two guineas per annum, including admission.

THE BRISTOL ACADEMY OF FINE ARTS.—The new exhibition of the Bristol Fine Arts Academy is one of the largest known for years, and the paintings are said to be of a high order. The number exhibited is 150 in excess of last year; the oil-paintings being 334 and water-colour 147. There are many local works exhibited; and many metropolitan artists are also exhibitors. At the Graphic *Conversazione*, which is considered the formal inauguration of the exhibition, a large and fashionable company attended. The principal object of attraction in the corridor on the "Graphic" floor was a large painting by Turner, lent by Mr. E. Fripp.

THE BRADFORD RESERVOIRS.—Sir George Grey has stated in the House of Commons, that the mayor of Bradford has informed him that the fears expressed by Mr. Ferrand, in the Commons, as to the Doe Park reservoir, are much exaggerated; that some repairs are going on at the reservoir; and that with the concurrence of the engineer instructions have been given to draw off the water, so as to prevent the possibility of accident while the repairs are going on. He further informs Sir George, that the engineer of the Bradford Corporation is Mr. Leather, of Leeds, and that he had nothing whatever to do with the construction of the Sheffield reservoir. Sir George had no information as to any other reservoirs belonging to the Bradford Waterworks. Mr. Ferrand, however, still insists that the Bradford reservoirs are in an alarming condition.

A PEOPLE'S HALL, CLUB, AND INSTITUTE FOR BATH.—A public meeting, convened by the mayor in consequence of a numerously-signed requisition, has been held in the Guildhall, to consider and adopt measures for the erection of a people's hall in Bath. There was a good attendance, including the mayor, who presided, the recorder, and several members of the People's Hall Committee and the Penny Reading Association. The following resolutions were passed by acclamation:—That it is desirable to promote the erection of a people's hall and club, with the following objects;—1, A large room for lectures, concerts, readings, and other means of improvement; 2, Smaller rooms for meetings of clubs, friendly societies, classes, and committees; 3, Facilities to the people to obtain tea, coffee, and, if possible, more substantial meals; 4, A reading-room and free library; 5, An office for a trade and service register; that a company of limited liability be formed, called the Bath People's Hall and Club Company, Limited, to consist of a capital of 6,000*l.*, of which 5,000*l.* shall be raised in shares of 1*l.* each, and 1,000*l.*, if possible, in donations; that the site which appears most eligible is the whole or part of the White Hart premises, and that a strong representation be made from this meeting to the town council, stating the desirability of erecting a people's hall and club, and requesting them to deal liberally with the promoters; and that the management of the affairs of the company be invested in twenty-one directors, two-thirds of whom shall be tradesmen and operatives, the directors to be appointed by the shareholders as soon as one-half the capital has been subscribed.

UTILIZATION OF GAS IN COKE BURNING.—At the Selly Oak Nail Works, Birmingham, a new system of coke burning has been adopted, whereby the offensive and pernicious gases which usually escape to taint the atmosphere and injure vegetation, are turned to good account, according to the *Midland Herald*, by being conveyed to a neighbouring furnace or fire, either for blast-heating, generation of steam, or other purposes where they can be usefully consumed. The new process consists in connecting a series of coke heaps with flues leading into one main flue communicating with the steam-boiler, the draught of which produces a beneficial effect; for as the coal heaps are lighted for burning into coke, the gas and sulphur thereby produced are drawn to the main flue, and from thence to the boiler, where they ignite and pass in streams of flame among the flues of the boiler, generating steam with very slight use of slack. There is a complete removal from the coal of all sulphurous properties, and thousands of tons of coal now considered of no use, may thus be converted into strong and good coke. The invention is patented by Messrs. J. & C. Hawkins, of Walsall.

BLACKFRIARS BRIDGE.—The construction of the temporary wooden bridge across the Thames, at Blackfriars, is so far advanced towards completion, that it is confidently expected to be opened in the first week of April.

EXTENSION OF SUNDERLAND PARK.—At a meeting of the Sunderland town council it has been resolved to complete the purchase of ground belonging to the North-Eastern Railway Company, for the extension of the park, the sum of 10,000*l.* being voted for that purpose.

THE NEWCASTLE-UPON-TYNE SURVEYORSHIP.—For this office, as we have before stated, there were 53 applicants, from the list of which seven were selected for further reduction. The council last week proceeded to the election, and the voting was as follows:—Mr. Parsons, 14 votes; Mr. Fulton, 12; Mr. Lamb, 11; Mr. Britton, 8; and Mr. Stephens, 3. A vote was then taken for the three highest, which gave—Parsons, 17; Lamb, 16; Fulton, 15. The final voting was—Lamb, 26; and Parsons, 22. Mr. Lamb was consequently elected.

NEW ENGRAVING PROCESSES, SUNK AND IN RELIEF.—Some curious experiments, executed before the Emperor and Empress of the French by M. Dulos, are thus described in *Galignani's Messenger*:—A sheet of copper, drawn on with lithographic ink, is subjected to the voltaic pile, by which it receives a deposit of iron on those parts not covered by the ink. The ink is then removed by means of benzine, and the sheet is then in the state of an engraved copper-plate—that is, the design is sunk into the plate, and the deposit of iron constitutes the lights. The plate is now dipped into a bath of cyanide of silver: under the action of the galvanic current, silver is deposited on the copper, and not on the iron. The plate is then taken out, and mercury poured upon it. Now, since mercury exercises no action on iron, it can only attack the silver which has filled up the lines originally made with lithographic ink. Hence, where those lines are, we now see mercury standing up in relief. Plaster of Paris is now poured over the plate in this condition, and thereby an impression is obtained in which the reliefs made by the mercury are reproduced hollow. [Why the ink was removed, or silver deposited, in this case, is not clearly stated.] By the aid of the pile copper may be deposited on this impression, and the hollows will then come out again in relief. One thus obtains not only a plate which may be printed from, but a matrix which will give an indefinite number of plates. For typographic engraving, the sheet of copper, after being drawn upon, receives a coating of silver, which only goes upon the metal, leaving the lithographic ink untouched. The ink is removed, as before, by benzine. The surfaces which are thus laid bare are oxydised, and mercury is again poured on the plate. This metal recoils from the oxydised lines, and collects on the silver, making reliefs where the lights ought to be. An impression in plaster is obtained as before, and the electro-chemical plate which is to be used for the printing has the lines of the drawing in relief as required.

THE ADYTIC LOCK.—In this lock, says the *Worcester Herald*, security against picking is sought and obtained, not by complication of the interior, but by absolutely closing the works of the lock from all observation and from all manipulation with any picking instrument. In the first model the key or check is conveyed into the lock by means of a kind of slotted piston, which moves through a collar or bearing, which, being somewhat longer than the slot, as a matter of course cuts off all communication by means of any instrument used in an attempt to touch the works from the outside. In the second model this object is still more effectually achieved by means of a secondary bolt, which, having in its centre a key-hole or receptacle for the check, enables the same to be introduced to this inner key-hole, provided the latter be brought into coincidence with the outer key-hole of the front plate and door. In order that the check so introduced may pass into the lock itself, it is necessary to move the secondary bolt, which, at the same time that it conveys the check into the lock, also bolts up the outer key-hole, thus closing all access from without, even to the inner key-hole. This same secondary bolt can never be brought into such a position as to allow even an air passage to the lock, thus rendering gunpowder of no more avail than picks to effect an entrance. But perhaps the most novel and valuable feature in this new system of lock-making is the certain retention of a false key or check on its first introduction.

DR. ESSELBACH, superintendent of the Persian Gulf telegraph, had been ill with fever for several days, and the triumphant success of the laying of the telegraph so affected his mind as to produce temporary insanity. In one of his paroxysms of madness he jumped overboard and was drowned.

NEW PATENT-OFFICES.—In reply to a question put by Lord A. Churchill to the First Commissioner of Works, Mr. Cowper said he had been in communication with the Commissioners of Patents with the view of finding more extended accommodation both for their offices and their museum. There was, however, great difficulty in making a suitable arrangement. At present no site had been found. That between Fife House and the proposed embankment of the Thames was not at present available, and could not be disposed of until the river works had made greater progress, and streets had been laid out on each side in connexion with the embankment.

UTILIZATION OF THE METROPOLITAN SEWAGE.—A meeting of the Ward of Portsoken was held, on Wednesday in last week, Alderman Sir Francis Graham Moon in the chair; when resolutions supporting the scheme of Mr. Thomas Ellis and his tender for the sewage were unanimously agreed to, copies being ordered to be forwarded to the chairman of the Metropolitan Board of Works, and the town clerk, for presentation to the Corporation of London, and to each member of the House of Commons, Corporation of London, Metropolitan Board of Works, Metropolitan vestries, and district boards of works.

IMPROVED DWELLINGS FOR THE INDUSTRIAL CLASSES.—The first ordinary meeting of this association was held on Saturday, at the Mansion House. The Right Hon. Lord Stanley, M.P., took the chair, supported by several influential men and members of the corporation. Lord Stanley said that most of the circumstances relating to the society were told in the report. The sum of 100*l.* had been paid in part payment of the purchase-money, 840*l.*, for eight small freehold houses, known as Hamilton-row and Hamilton-place, Bagnigge-wells-road. An agreement for a lease of ninety-nine years for a piece of land close to the Tunnel Pier, Wapping, had been come to with the governors of the Bridewell Hospital. The Board was also negotiating for a lease of eighty years from the Metropolitan Board of Works for a plot of ground in Redcross-street, closely abutting on New Southwark-street, Borough. Further negotiations had been entered upon to obtain sites at King's-cross, Victoria-street, and in Shoreditch. The subscribed capital of the society was 27,200*l.*, and upwards of 3,000*l.* had been received in advance of calls, on which they were receiving 5 per cent. Some delay in building had been occasioned, but without any loss of money. There had been some difficulty in finding sites, but this had been partially surmounted. The estate in the Bagnigge Wells-road had been obtained upon the most favourable terms. This plot was about 4,000 square feet, and the estate at Wapping, upon which buildings would be erected to cost 7,075*l.*, was 19,000 square feet. These were very conveniently situate for the purposes for which they would be used. The Southwark estate had a 56 feet frontage, and was in extent 28,000 square feet. Those at Wapping were paying up to the present time, upon an average, about 8 per cent. They proposed to put up there three blocks of houses, and the remainder in obedience to the demand of the neighbourhood. The buildings proposed to be erected would accommodate sixty families. The contract had been entered into for the buildings at Southwark, which would involve an expenditure of 3,000*l.*

TENDERS.

For alterations at the Union Tavern, 191, Oxford-street, for Mr. Smith. Mr. Barrett, architect:—

Sharpington & Cole	£880	0	0
Hyde	840	0	0
Duncanson & Moultrie	832	0	0
Langmead	695	0	0
Langtree	630	0	0

For the erection of gymnasium in the St. Pancras-road. Mr. Edward A. Gruning, architect. Quantities supplied by Mr. W. R. Gritten:—

Humphery & Morris	£6,521	0	0
Timewell	6,342	0	0
Nixon	6,247	0	0
Mansfield & Son	6,000	0	0
J. & C. I'Anson	5,740	0	0
Piper & Wheeler (accepted)	5,437	0	0